

**TABLE 18. SAN PEDRO-WILLCOX PLAYA-RIO YAQUI WATERSHED – ASSESSMENT, PLANNING LIST, AND 303(d) STATUS**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
<b>SAN PEDRO-WILLCOX PLAYA-RIO YAQUI WATERSHED – STREAM ASSESSMENTS</b>				
Aravaipa Creek Stowe Gulch - Wilderness Area 18 miles AZ15050203-004B Unique Water (previously listed as Aravaipa Canyon Creek)	A&Ww    Attaining FC        Attaining FBC       Attaining AgL       Attaining Category 1 – Attaining All Uses			
Aravaipa Creek Wilderness Area - San Pedro River 13 miles AZ15050203-004C (previously listed as Aravaipa Canyon Creek)	A&Ww    Inconclusive FC        Inconclusive FBC       Inconclusive AgL       Inconclusive Category 3 – Inconclusive	On the Planning List due to <u>missing core parameters</u> : <i>Escherichia coli</i> , dissolved oxygen, dissolved metals (cadmium, copper, and zinc), and total metals (mercury, arsenic, chromium, copper, and lead).		
Bass Canyon Creek tributary at 32 26°06'N/110 1°3'18" - Hot Springs Canyon Creek 12 miles AZ15050203-899B (Reach was split into warmwater and coldwater segments since the last assessment. No current data in 899A.)	A&Ww    Attaining FC        Attaining FBC       Attaining AgL       Attaining Category 1 – Attaining All Uses			
Bass Canyon, <u>unnamed tributary of</u> headwaters - Bass Canyon Creek 1 mile AZ15050203-935	A&Ww    Inconclusive FC        Inconclusive FBC       Inconclusive Category 3 — Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Brewery Gulch Wildcat Canyon - Mule Gulch 1 mile AZ15080301-337	A&We    Impaired PBC       Inconclusive (see note to the right)		Samples collected for Mule Gulch TMDL study. Reach is "impaired," but copper and pH loadings are being addressed as part of the Mule Gulch TMDL report (5 of 5 copper samples and 1 of 5 pH results did not meet standards). Reach will not appear separately on the 303(d) List.	
Buehman Canyon headwaters - end of Unique Water 10 miles AZ15050203-010A Unique Water	A&Ww    Attaining FC        Attaining FBC       Attaining AgL       Attaining Category 1 – Attaining All Uses	Remove beryllium from the Planning List, as the standard was revised in 2002. No exceedances based on the new standard.		
C - Canyon headwaters - Mule Gulch 0.5 miles AZ15080301-342	A&We    Inconclusive PBC       Inconclusive Category 3 — Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		Sample collected for Mule Gulch TMDL study. Copper and pH loadings will be addressed in the Mule Gulch TMDL report (1 of 1 samples exceeded copper standards).
Copper Creek headwaters - Prospect Canyon 7 miles AZ15050203-022A	A&Ww    Inconclusive FC        Attaining FBC       Attaining AgL       Attaining Category 2 – Attaining Some Uses	On the Planning List due to <u>chronic selenium</u> exceedance (1 of 1 sampling event).		

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SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Double R Canyon Creek headwaters - Bass Canyon Creek 5 miles AZ15050203-902	A&Ww    Attaining FC        Attaining FBC       Inconclusive Category 2 – Attaining Some Uses	On the Planning List due to <u>missing core parameter:</u> <i>Escherichia coli</i> .  Remove <u>dissolved oxygen</u> , as site investigation revealed that the low dissolved oxygen was naturally occurring due to ground water upwelling, and not anthropogenic causes.		
Dubacher Canyon headwaters - Mule Gulch 1 miles AZ15080301-075	A&Ww    Inconclusive PBC       Inconclusive Category 3 — Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		Samples collected for Mule Gulch TMDL study. <u>Copper and pH</u> loadings will be addressed in the Mule Gulch TMDL report (1 of 1 copper and pH samples did not meet standards).
Grant Creek headwaters - trib at 32 38'09" / 109 56'35" 13 miles AZ15050201-033A	A&Wc    Inconclusive FC        Inconclusive FBC       Inconclusive DWS       Inconclusive AgL       Inconclusive Category 3 — Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 2 samples).		
Hendricks Gulch headwaters - Mule Gulch 0.5 miles AZ15080301-335	A&Ww    Inconclusive PBC       Inconclusive Category 3 -- Inconclusive			Samples collected for Mule Gulch TMDL study. <u>Copper and pH</u> loadings will be addressed in the Mule Gulch TMDL report (1 of 3 copper and 1 of 2 pH samples did not meet standards).
Hot Springs Canyon Creek headwaters - San Pedro River 26 miles AZ15050203-013	A&Ww    Attaining FC        Attaining FBC       Attaining AgL       Attaining Category 1 – Attaining All Uses			
Leslie Canyon Creek headwaters - Whitewater Draw 25 miles AZ15080301-007	A&Ww    Inconclusive FC        Inconclusive FBC       Inconclusive AgL       Inconclusive Category 3 — Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Miller Canyon Creek headwaters - Broken Arrow Ranch Road 4 miles AZ15050202-409A	A&Wc    Inconclusive FC        Inconclusive FBC       Inconclusive DWS       Inconclusive AgL       Inconclusive Category 3 — Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Morales Creek headwaters - Mule Gulch 2 miles AZ15080301-331	A&Ww    Inconclusive PBC       Inconclusive Category 3 — Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		Samples collected for Mule Gulch TMDL study. <u>Copper</u> loadings will be addressed in the Mule Gulch TMDL report (1 of 1 copper sample exceeded standards).
Mule Gulch headwaters - above Lavender Pit 4 miles AZ15080301-090A (Reach previously known as 090A, now split into 090A and 090B. Designated uses were also modified.)	A&Ww    Impaired PBC       Inconclusive AgL       Inconclusive Category 5 – Impaired	On the Planning List due to <u>missing core parameters:</u> <i>Escherichia coli</i> , dissolved oxygen, turbidity/SSC, and total mercury.  Remove <u>lead</u> from the Planning List (exceedance occurred in the segment below before reach was split).	On the 303(d) List (since 1990) for <u>copper</u> . (Acute standard exceeded in 7 of 15 samples, and chronic standard exceeded in 8 of 15 samples.) ADEQ is currently working on a TMDL and site specific standards for this reach.  <u>Delist pH and zinc</u> from the 303(d) List (no zinc exceedances in 15 samples and only 1 low pH in 10 samples).	

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SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Mule Gulch above Lavender Pit - Bisbee WWTP 1 mile AZ15080301-090B (Reach previously known as 090A, now split into 090A and 090B. Designated uses were also modified.)	A&We Impaired PBC Impaired Category 5 – Impaired	On the Planning List due to <u>dissolved lead</u> exceedance (1 of 2 samples).	On the 303(d) List (since 1990) for <u>copper</u> . (Acute copper exceedances in 8 of 8 sampling events and total copper exceedances in 7 of 8 samples).  EPA placed pH on the list based on 7 of 15 exceedances, although Arizona's Impaired Water Identification Rule requires at least 20 samples to make a listing for pH. However, once listed, the reach cannot be delisted until a TMDL is complete or pH data indicate designated uses are being attained. In current data, pH exceeded standards in 7 of 7 samples.  <u>Delist zinc</u> . No exceedances in the last 3 years of sampling (0 in 4 samples).  ADEQ is currently working on a TMDL and site specific standards for this reach.	
Mule Gulch Bisbee WWTP - Highway 80 Bridge 4 miles AZ15080301-090C (Reach previously known as 090B, now 090C and 090D. Designated uses were also modified.)	A&Wedw Impaired PBC Impaired Category 5 – Impaired	On the Planning List due to: 1. <u>Chronic lead</u> exceedance (1 of 6 sampling events) and total lead exceedance (1 of 5 samples). 2. <u>Missing core parameters</u> : <i>Escherichia coli</i> , turbidity/SSC, and dissolved oxygen.	On the 303(d) List (since 1990) for <u>copper</u> , <u>zinc</u> , and <u>low pH</u> . (Acute and chronic copper exceedances in 12 of 12 sampling events and total copper exceedances in 6 of 21 samples. Low pH in 5 of 23 samples. Acute and chronic zinc exceedances in 5 of 12 sampling events.)  <u>Add cadmium</u> to the 303(d) List. (Acute cadmium exceedances in 3 of 8 sampling events and chronic cadmium exceedances in 6 of 8 sampling events.)  ADEQ is currently working on a TMDL and site specific standards for this reach.	
Mule Gulch Highway 80 bridge - Whitewater Draw 5 miles AZ15080301-090D (Reach previously part of 090B, now split into 090C and 090D. Designated uses were also modified.)	A&We Inconclusive PBC Inconclusive AgL Inconclusive Category 3 – Inconclusive	On the Planning List due to: 1. <u>Copper</u> exceedances (1 of 1 samples) and 2. <u>Insufficient monitoring</u> .		
Mural and Grassy Hill tributary headwaters - Mule Gulch 2 miles AZ15080301-344	A&We Inconclusive PBC Inconclusive Category 3 — Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		Samples collected for Mule Gulch TMDL study. <u>Copper</u> and pH loadings will be addressed in the Mule Gulch TMDL report (1 of 1 copper sample exceeded standards).
OK and Youngblood headwaters - Brewery Gulch 1 mile AZ15080301-1000	A&We Inconclusive PBC Inconclusive Category 3 — Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		Samples collected for Mule Gulch TMDL study. <u>Copper</u> and pH loadings will be addressed in the Mule Gulch TMDL report (1 of 1 copper sample exceeded standards.)
Ramsey Canyon Creek headwaters - Forest Rd. 110 4 miles AZ15050202-404A (Reach was split into warmwater and coldwater segments since the last assessment. No current data in 404B.)	A&Wc Inconclusive FC Attaining FBC Attaining AgL Attaining AgL Attaining Category 2 – Attaining Some Uses	On the Planning List due to <u>missing core parameter</u> : dissolved zinc.		
Rucker Canyon Creek headwaters - Whitewater Draw 10 miles AZ15080301-288	A&Wc Attaining FC Attaining FBC Attaining AgL Attaining Category 1 – Attaining All Uses			



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San Pedro River Mexico border - Charleston 28 miles AZ15050202-008	A&Ww Impaired FC Attaining FBC Attaining Agl Attaining Agl Attaining Category 5 – Impaired	On the Planning List due to chronic <u>selenium</u> exceedance (1 of 1 sampling event).  Remove <u>beryllium</u> from the Planning List. Standard revised in 2002. No exceedances of the new standard.	Add <u>copper</u> to the 303(d) List for chronic copper exceedances (2 of 16 sampling events).	
San Pedro River Charleston - Walnut Gulch 9 miles AZ15050202-006	A&Ww Inconclusive FC Attaining FBC Attaining Agl Attaining Agl Attaining Category 2 – Attaining Some Uses	On the Planning List due to exceedance of the former <u>turbidity</u> standard (1 of 4 samples). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.		
San Pedro River Babocomari Creek - Dagoon Wash 17 miles AZ15050202-003	A&Ww Attaining FC Attaining FBC Impaired Agl Attaining Agl Attaining Category 5 – Impaired	Remove <u>turbidity</u> from the Planning List. No exceedances in 4 samples.	Add <u>Escherichia coli</u> to the 303(d) List due to exceedances in 2 of 4 sampling events (occurred in 2000).	
San Pedro River Dagoon Wash - Tres Alamos Wash 16 miles AZ15050202-002	A&Ww Impaired FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 5 – Impaired	On the Planning List due to <u>missing all core parameters</u> .  Added in 2002 due to exceedances of the former <u>fecal coliform</u> and <u>turbidity</u> standards. No current <u>Escherichia coli</u> , <u>turbidity</u> or <u>SSC</u> data. Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.	On the 303(d) List (since 1990) for <u>nitrate</u> . Currently, 35 of 108 samples exceeded nitrate standards.  Nitrate sampling was conducted to determine the effectiveness of Superfund mitigation efforts. Contaminated ground water is seeping into the San Pedro near the Apache Nitrogen Products site.	
San Pedro River Hot Springs Creek - Redfield Canyon 13 miles AZ15050203-011	A&Ww Inconclusive FC Attaining FBC Inconclusive Agl Attaining Agl Attaining Category 2 – Attaining Some Uses	On the Planning List due to: 1. <u>Escherichia coli</u> exceedance (1 of 7 sampling events, occurred in 2000). 2. Former <u>turbidity</u> standard exceedance (1 of 8 samples). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.		
San Pedro River Aravaipa Creek - Gila River 15 miles AZ15050203-001	A&Ww Impaired FC Attaining FBC Impaired Agl Attaining Category 5 – Impaired	On the Planning List due to chronic <u>mercury</u> exceedance (1 of 1 sampling event).  Remove <u>turbidity</u> from the Planning List. One exceedance in 13 samples indicates support of designated uses.	Add <u>Escherichia coli</u> to the 303(d) List due to exceedances in 2 of 11 sampling events (occurred in 2000 and 2001).  Add <u>selenium</u> to the 303(d) List due to chronic selenium exceedances (2 of 2 sampling events).	
Spring Canyon Creek headwaters - Mule Gulch 1 mile AZ15080301-333	A&We Inconclusive PBC Inconclusive Category 3 – Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		Samples collected for Mule Gulch TMDL study. <u>Copper</u> or <u>pH</u> loadings will be addressed in the Mule Gulch TMDL report. (No exceedances reported in 1 sample.)
Ward Canyon Creek headwaters - Turkey Creek 3 miles AZ15050201-433	A&Wc Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Category 3 – Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Whitewater Draw Gadwell Canyon - unnamed tributary 15080301-003 22 miles AZ15080301-004 (Designated uses and reach delineations have changed on this stream since the last assessment.)	A&We Inconclusive PBC Inconclusive Agl Inconclusive Category 3 – Inconclusive	On the Planning List due to: 1. Insufficient monitoring data to assess (only 2 samples). 2. <u>Lead</u> exceedance (1 of 1 sample).		



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Whitewater Draw unnamed tributary 15080301-003 to unnamed tributary at 31 20°36'109 34°46" 6 miles AZ15080301-002A (Designated uses and reach delineations have changed on this stream since the last assessment.)	A&We Inconclusive PBC Inconclusive AgL Inconclusive Category 3 – Inconclusive	On the Planning List due to: 1. Insufficient monitoring data to assess (only 1 sample). 2. Added in 2002 due to: <u>lead, zinc, manganese, beryllium, and turbidity exceedances, low dissolved oxygen and missing core parameters.</u>  Remove manganese and beryllium from the Planning List due to revised standards adopted in 2002. The old beryllium and manganese data do not exceed the new standards.  Remove dissolved oxygen and turbidity from the Planning List as these standards do not apply in an ephemeral water. (Change in designated uses.)		
Whitewater Draw unnamed tributary at 31 20°36'109 34°46" to Mexico border 0.4 miles AZ15080301-002B (This reach was split into 2 segments and designated uses have changed on this stream since the last assessment.)	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Attaining Category 2 – Attaining Some Uses	On the Planning List due to: 1. <u>Lead</u> exceedance (1 of 4 samples). 2. <u>Low dissolved oxygen</u> (no current data, added to the Planning List in 2002 after being delisted from 303(d) List) 3. <u>Turbidity</u> exceedances (no current data, added to the Planning List in 2002 after being delisted from the 303(d) List). 4. <u>Missing core parameters:</u> <i>Escherichia coli</i> , dissolved oxygen, turbidity/SSC, dissolved cadmium, and total mercury.  Remove zinc, manganese, and beryllium from the Planning List. No exceedances in 5 samples. (New manganese and beryllium standards.)		
Winwood Canyon headwaters - Mule Gulch 2 mile AZ15080301-340	A&We Inconclusive PBC Inconclusive Category 3 – Inconclusive	On the Planning List due to insufficient monitoring data to assess (2 samples).		Samples collected for Mule Gulch TMDL study. <u>Copper and pH</u> loadings will be addressed in the Mule Gulch TMDL report (1 of 2 copper samples exceeded standards).
<b>SAN PEDRO-WILLCOX PLAYA-RIO YAQUI WATERSHED – LAKE ASSESSMENTS</b>				
Riggs Flat Lake 9 acres AZL15050201-1210	A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive AgL Inconclusive Category 3 – Inconclusive Trophic status – Eutrophic	On the Planning List due to: 1. Insufficient monitoring data to assess (only 1 sample). 2. Added in 2002 due to former <u>turbidity</u> standard exceedance (1 of 1 sample). Causes and sources of turbidity will be investigated during the next monitoring cycle for this watershed.		
Snow Flat Lake 1 acre AZL15050201-1420	A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive AgL Inconclusive Category 3 – Inconclusive Trophic status – Mesotrophic	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Twin Pond 1 acre AZ15080302-0001	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Category 3 – Inconclusive Trophic status not calculated	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		





*Redrock Canyon Creek, near Patagonia, Arizona.*

## The Santa Cruz-Rio Magdalena-Rio Sonoyta Watershed

This watershed is composed of two drainages: the Santa Cruz River which flows north to the Gila River and a series of streams that flow south and eventually combine to form the Rio Magdalena and the Rio Sonoyta in Mexico.

Groundwater pumping has eliminated natural perennial flow in most of the mainstem Santa Cruz River. Treated wastewater effluent provides the perennial flow below discharges from the cities of Nogales and Tucson.

Most of the population in this 11,100 square-mile watershed is clustered around metropolitan Tucson (approximately 844,000 people in 2000 census), Nogales, Arizona and Sonora, Mexico (370,000 people, mostly in Mexico). Land ownership is approximately: 20% private land, 15% state land, 25% federal land, and 40% Tribal land. Grazing is the dominant land use, with irrigated crop production near stream beds. Active and abandoned mines are scattered throughout the watershed. There are eight wilderness areas along with national forests and national monuments with restricted land uses.

Elevations range from 9,156 feet (above sea level) at Mount Lemmon to about 1,100 feet at the Gila River. Except for a string of high mountains in the east, most of the watershed is below 5,000 feet, with low desert flora and fauna and warmwater aquatic communities where perennial waters exist.

**The assessment** – Assessments were completed for 33 stream reaches and seven lakes in this watershed. Of the 272 stream miles assessed, 38 miles were attaining all uses (three reaches) and 107 miles (15 reaches) were assessed as impaired or not attaining a use. Of the 557 lake acres assessed, none were assessed as attaining all uses and 180 acres (three lakes) were assessed as impaired or not attaining a use. All others were inconclusive or attaining some uses.

A watershed assessment map follows on the next page, illustrating stream and lake assessments by category. The Santa Cruz **monitoring table (Table 19)** following the map summarizes the water quality data used in the assessment. It is followed by the **assessment table (Table 20)**, which bridges current assessments with past assessments and impaired water identification. Important to note in this table are comments regarding previous 303(d) lists (what has been added and removed), category designations (1 through 5), references to potential actions by EPA, and status of TMDLs.

Detailed information on how to use these tables is found at the beginning of this chapter (p. IV-1). Assessment methods and criteria can be found in Chapter III.



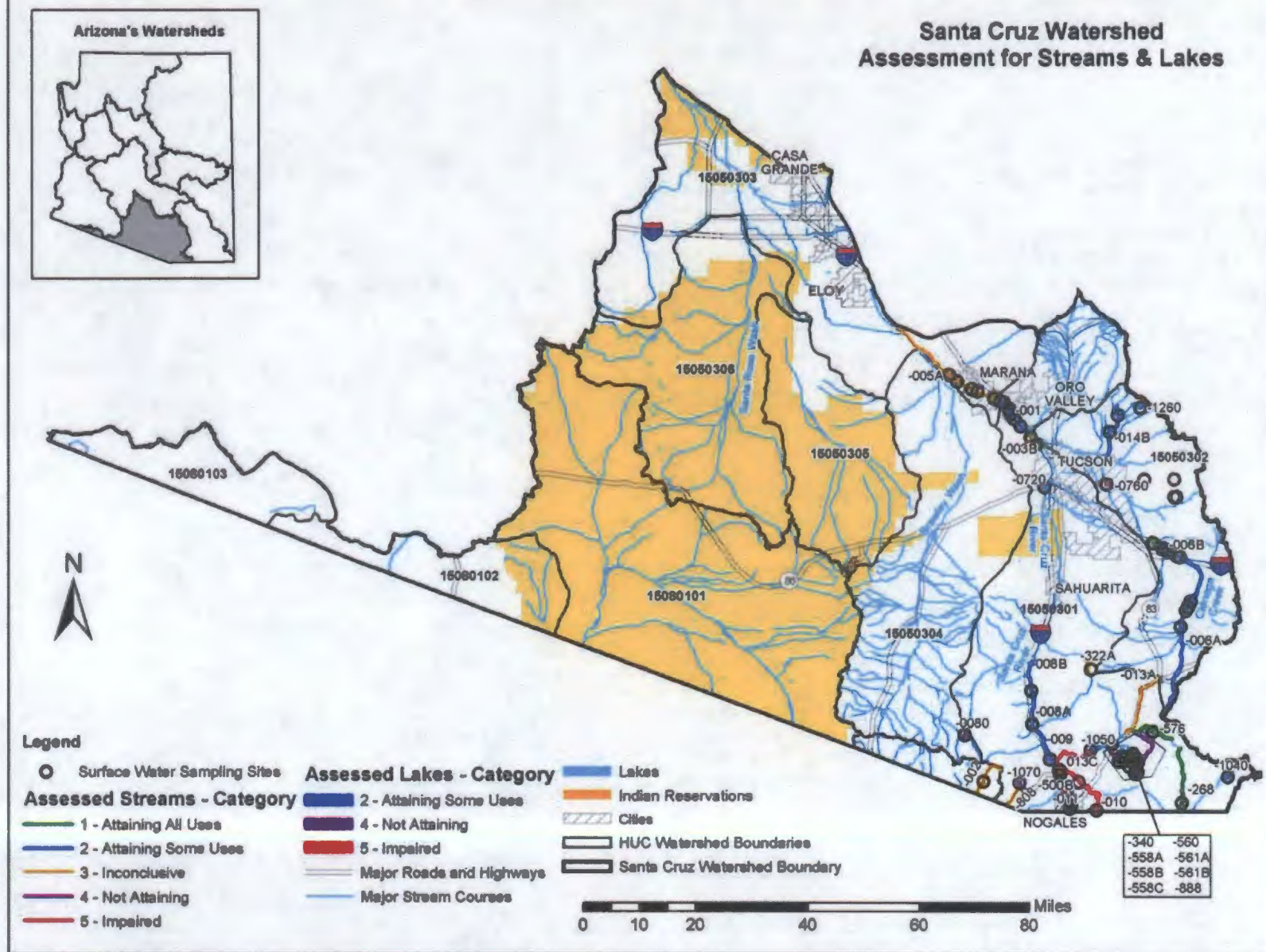


Figure 22. Watershed monitoring and assessments



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
STREAM MONITORING DATA								
Alum Gulch headwaters - 31 28°20'/110 43°51" AZ15050301-561A A&We, PBC, AgL	ADEQ TMDL Program Below Trench Camp Mine SCALG005.90	1999 - 1 partial suite	pH SU	6.5 - 9.0 (A&We, PBC, AgL)	5.9	1 of 1		
			Zinc (dissolved) µg/L	varies by hardness (A&We)	2500	1 of 1		
	ADEQ TMDL Program Below January adit, Above Humboldt Canyon SCALG005.58	1999 - 1 partial suite 2000 - 1 partial suite	Cadmium (total) µg/L	84 (FC)	140 - 180	2 of 2		
				50 (AgL)		2 of 2		
			Copper (dissolved) µg/L	varies by hardness (A&We)	110 - 400	2 of 2		
			pH SU	6.5 - 9.0 (A&We, PBC, AgL)	4.5 - 5.3	2 of 2		
			Zinc (dissolved) µg/L	varies by hardness (A&We)	39,000 - 56,000	2 of 2		
			Zinc (total) µg/L	25,000 (AgL)	42,000 - 56,000	2 of 2		
	ADEQ TMDL Program Below Humboldt Canyon, Above Alum Falls SCALG005.30	1999 - 1 partial suite	Cadmium (total) µg/L	84 (FC)	180	1 of 1		
				50 (AgL)		1 of 1		
			Copper (dissolved) µg/L	varies by hardness (A&We)	1200	1 of 1		
			Copper (total) µg/L	500 (AgL)	1200	1 of 1		
			pH SU	6.5 - 9.0 (A&We, PBC, AgL)	3.6	1 of 1		
			Zinc (dissolved) µg/L	varies by hardness (A&We)	44,000	1 of 1		
			Zinc (total) µg/L	25,000 (AgL)	41,000	1 of 1		

**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	<b>Summary Row</b>  A&Ww Not attaining PBC Not attaining AgL Not attaining	1999 - 2000  4 samples 2 sampling events	Cadmium (total) µg/L	84 (FC)	10 - 180	3 of 4	Inconclusive (Not attaining)	ADEQ collected 4 samples at 3 sites in 1999-2000. TMDLs for cadmium, copper, zinc and pH were approved by EPA in 2003. Assessed as "not attaining" due to copper, cadmium and zinc exceedances, and low pH.
				50 (AgL)		3 of 4	Inconclusive (Not attaining)	
			Copper (dissolved) µg/L	varies by hardness (A&Ww)	13 - 1200	3 of 4 samples 2 of 2 events (in 1999 - 2000)	Not attaining	Although current data for cadmium and pH are "inconclusive," this reach will remain "not attaining" until data indicate that all uses are attaining for parameters addressed in the TMDL.
			Copper (total) µg/L	500 (AgL)	63 - 1200	1 of 4	Inconclusive (Not attaining)	
			pH SU	6.5 - 9.0 (A&Ww, PBC, AgL)	3.6 - 5.9	4 of 4	Inconclusive (Not attaining)	Placed on the Planning List for TMDL follow-up monitoring and missing core parameter: total lead.
			Zinc (dissolved) µg/L	varies by hardness (A&Ww)	2500 - 56,000	4 of 4 samples 2 of 2 events (in 1999 - 2000)	Not attaining	
			Zinc (total) µg/L	25,000 (AgL)	2900 - 56,000	3 of 4	Inconclusive (Not attaining)	
Alum Gulch 31 28°20'1110 43°51" - 31 29°17'1110 44°25" AZ15050301-561B A&Ww, FC, FBC, AgL	ADEQ TMDL Program Below Alum Falls, Above World's Fair Mine SCALG004.98	1999 - 1 partial suite	Cadmium (dissolved) µg/L	varies by hardness (A&Ww acute)	160	1 of 1		
				varies by hardness (A&Ww chronic)		1 of 1		
			Cadmium (total) µg/L	84 (FC)	160	1 of 1		
				50 (AgL)		1 of 1		
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	1500	1 of 1		
				varies by hardness (A&Ww chronic)		1 of 1		
			Copper (total) µg/L	1300 (FBC)	1400	1 of 1		
				500 (AgL)		1 of 1		

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STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
			pH SU	6.5 - 9.0 (A&Ww, FBC, AgL)	3.5	1 of 1		
			Zinc (dissolved) µg/L	varies by hardness (A&Ww acute)	46,000	1 of 1		
				varies by hardness (A&Ww chronic)		1 of 1		
			Zinc (total) µg/L	25,000 (AgL)	49,000	1 of 1		
	ADEQ TMDL Program Below World's Fair Mine SCALG004.62	1998 - 3 partial suites	Cadmium (dissolved) µg/L	varies by hardness (A&Ww acute)	28 - 194	3 of 3		
				varies by hardness (A&Ww chronic)		3 of 3		
			Cadmium (total) µg/L	84 (FC)	27 - 174	1 of 3		
				50 (AgL)		1 of 3		
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	881 - 2110	3 of 3		
				varies by hardness (A&Ww chronic)		3 of 3		
			Copper (total) µg/L	1300 (FBC)	799 - 2140	1 of 3		
				500 (AgL)		3 of 3		
			pH SU	6.5 - 9.0 (A&Ww, FBC, AgL)	3.3 - 3.7	3 of 3		
			Zinc (dissolved) µg/L	varies by hardness (A&Ww acute)	6110 - 56,200	3 of 3		
				varies by hardness (A&Ww chronic)		3 of 3		
			Zinc (total) µg/L	25,000 (AgL)	5730 - 50,800	1 of 3		
	ADEQ TMDL Program 200 meters below World's Fair Mine SCALG004.61	1999 - 1 partial suite 2000 - 1 partial suite	Cadmium (dissolved) µg/L	varies by hardness (A&Ww acute)	170 - 220	2 of 2		
				varies by hardness (A&Ww chronic)		2 of 2		



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
			Cadmium (total) µg/L	84 (FC)	170 - 290	2 of 2		
				50 (AgL)		2 of 2		
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	1600 - 2000	2 of 2		
				varies by hardness (A&Ww chronic)		2 of 2		
			Copper (total) µg/L	1300 (FBC)	1900 - 2100	2 of 2		
				500 (AgL)		2 of 2		
			pH SU	6.5 - 9.0 (A&Ww, FBC, AgL)	3.2	2 of 2		
			Zinc (dissolved) µg/L	varies by hardness (A&Ww acute)	49,000 - 53,000	2 of 2		
				varies by hardness (A&Ww chronic)		2 of 2		
			Zinc (total) µg/L	25,000 (AgL)	45,000 - 54,000	2 of 2		
	<b>Summary Row</b>  A&Ww      Not attaining FC          Not attaining FBC        Not attaining AgL        Not attaining	1998 - 2000  6 samples 5 sampling events	Cadmium (dissolved) µg/L	varies by hardness (A&Ww acute)	28 - 228	5 of 5 events (in 1998 - 2000)	Not attaining	ADEQ collected 6 samples at 3 sites in 1998-2000. TMDLs for cadmium, copper, zinc and pH were approved by EPA in 2003. Assessed as "not attaining" due to cadmium, copper and zinc exceedances, and low pH.  Although current data for cadmium and pH are "inconclusive," this reach will remain "not attaining" until data indicate that all uses are attaining for parameters addressed in the TMDL.  Placed on the Planning List for TMDL follow-up monitoring and for missing core parameters: Escherichia coli, total metals (lead and mercury), and turbidity/SSC.
				varies by hardness (A&Ww chronic)		5 of 5 events	Not attaining	
			Cadmium (total) µg/L	84 (FC)	27 - 290	4 of 6	Inconclusive (Not attaining)	
				50 (AgL)		4 of 6	Inconclusive (Not attaining)	
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	881 - 2110	5 of 5 events (in 1998 - 2000)	Not attaining	
				varies by hardness (A&Ww chronic)		5 of 5 events	Not attaining	
			Copper (total) µg/L	1300 (FBC)	799 - 2140	4 of 6	Inconclusive (Not attaining)	
				500 (AgL)		6 of 6	Inconclusive (Not attaining)	
			pH SU	6.5 - 9.0 (A&Ww, FBC, AgL)	3.2 - 3.7	6 of 6	Inconclusive (Not attaining)	

**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
			Zinc (dissolved) µg/L	varies by hardness (A&Ww acute)	6110 - 56,200	5 of 5 events (in 1998 - 2000)	Not attaining	
				varies by hardness (A&Ww chronic)		5 of 5 events	Not attaining	
			Zinc (total) µg/L	25,000 (Agl.)	5730 - 54,000	4 of 6	Inconclusive (Not attaining)	
Chimenea Creek headwaters - Rincon Creek AZ15050302-140 A&Ww, FC, FBC (tributary rule)	USGS Ambient Monitoring At Saguaro National Park SCCHM004.75 101593	2002 - 1 partial suite	No exceedances					
	USGS Ambient Monitoring Near Madrona ranger station SCCHM002.25 101584	2002 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive	2002 2 sampling events	No exceedances					Insufficient monitoring data to assess.
Cienega Creek headwaters - Gardner Canyon AZ15050302-006A A&Ww, FC, FBC, AgL Unique Water	ADEQ Ambient Monitoring SCCIE014.39 101178	2000 - 1 full suite 2001 - 5 full suites 2002 - 1 full suite	No exceedances					
	ADEQ SEM Program Below Stevenson Canyon SCCIE12.38 100601	1998 - 1 partial suite	No exceedances					
	ADEQ Ambient Monitoring Below Narrows SCCIE011.80 100600	1998 - 1 partial suite	No exceedances					
	ADEQ Ambient Monitoring SCCIE010.21 101177	2000 - 1 full suite 2001 - 4 full suites 2002 - 1 full suite	Turbidity (former standard) NTU	50 (A&Ww)	1 - 54	1 of 6		
	Summary Row A&Ww Attaining FC Attaining FBC Inconclusive AgL Attaining	1998 - 2002 15 samples 8 sampling events	Turbidity (former standard) NTU	50 (A&Ww)	1 - 54	1 of 14	Attaining	ADEQ collected 15 samples at 4 sites in 1998-2002. Assessed as "attaining some uses" due to missing core parameter: E. coli.



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
Cienega Creek Gardner Canyon - USGS gage station (Pantano Wash) AZ15050302-006B A&Ww, FBC, FC, AgL	ADEQ Ambient Monitoring Below tilted beds SCCIE003.55 100599	1998 - 1 partial suite	No exceedances					
	ADEQ Ambient Monitoring SCCIE002.66 101178	2000 - 1 full suite 2001 - 4 full suites 2002 - 1 full suite	Dissolved oxygen mg/L	>6.0 (90% saturation)	5.5 - 9.8 (80 - 109%)	1 of 8		Low dissolved oxygen due to naturally occurring ground water upwelling, and not anthropogenic causes. Not included in final assessment.
	ADEQ Ambient Monitoring SCCIE001.49 101179	2000 - 1 full suite 2001 - 4 full suites 2002 - 1 full suite	No exceedances					
	ADEQ Ambient Monitoring Above Davidson Canyon SCCIE001.20 100598	1998 - 1 partial suite	Dissolved oxygen mg/L	>6.0 (90% saturation)	5.4 (85%)	1 of 1		Low dissolved oxygen due to naturally occurring ground water upwelling, and not anthropogenic causes. Not included in final assessment.
	ADEQ Ambient Monitoring At Marsh Station Rd. SCCIE001.07 100263	1998 - 1 partial suite	No exceedances					
	ADEQ Ambient Monitoring Above diversion dam SCCIE000.42 100595	1998 - 1 partial suite	Dissolved oxygen mg/L	>6.0 (90% saturation)	4.8 (57%)	1 of 1		Low dissolved oxygen due to naturally occurring ground water upwelling, and not anthropogenic causes. Not included in final assessment.
	Summary Row A&Ww    Attaining FC        Attaining FBC      Inconclusive AgL       Attaining	1998 - 2002  16 samples 7 sampling events	No exceedances					ADEQ collected 16 samples at 6 sites in 1998-2002. Assessed as "attaining some uses" due to missing core parameter: E. coli.
Cox Gulch headwaters - Three R Canyon AZ15050301-580 A&Ww, FBC, FC (tributary rule)	ADEQ TMDL Program Above European Mine Canyon SCCIE001.04	1999 - 1 partial suite	Cadmium (dissolved) µg/L	varies by hardness (A&Ww acute)	25	1 of 1		
				varies by hardness (A&Ww chronic)		1 of 1		
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	6000	1 of 1		
				varies by hardness (A&Ww chronic)		1 of 1		
			Copper (total) µg/L	500 (AgL)	8700	1 of 1		
				1300 (FBC)		1 of 1		
			Zinc (dissolved) µg/L	varies by hardness (A&Ww acute)	5900	1 of 1		
				varies by hardness (A&Ww chronic)		1 of 1		



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	ADEQ TMDL Program Below European Mine Canyon SCCIE000.85	1999 - 1 partial suite 2000 - 1 partial suite	Cadmium (dissolved) µg/L	varies by hardness (A&Ww acute)	15 - 60	2 of 2		
				varies by hardness (A&Ww chronic)		2 of 2		
			Cadmium (total) µg/L	50 (Agl)	72	1 of 2		
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	8200 - 18,000	2 of 2		
				varies by hardness (A&Ww chronic)		2 of 2		
			Copper (total) µg/L	500 (Agl)	8800 - 18,000	2 of 2		
				1300 (FBC)		2 of 2		
			pH SU	8.5 - 9.0 (A&Ww, FBC)	3.3	1 of 1		
			Zinc (dissolved) µg/L	varies by hardness (A&Ww acute)	3200 - 11,000	2 of 2		
				varies by hardness (A&Ww chronic)		2 of 2		
	Summary Row  A&Ww Not attaining FC inconclusive FBC Not attaining	1999 - 2000  3 samples 2 sampling events	Cadmium (dissolved) µg/L	varies by hardness (A&Ww acute)	15 - 60	3 of 3 samples 2 of 2 events (in 1999 and 2000)	Not attaining	ADEQ collected 3 samples at 2 sites in 1999-2000. Cadmium, copper, pH, and zinc loadings on this reach were addressed in the TMDL for Three R Canyon approved by EPA in 2003.  Assessed as "not attaining" due to cadmium, copper, pH, and zinc exceedances.  Placed on the Planning List for TMDL follow up monitoring and missing core parameters: <i>Escherichia coli</i> , dissolved oxygen, total mercury, turbidity/SSC.
				varies by hardness (A&Ww chronic)	15 - 60	3 of 3 samples 2 of 2 events	Not attaining	
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	8000 - 18,000	3 of 3 samples 2 of 2 events (in 1999 - 2000)	Not attaining	
				varies by hardness (A&Ww chronic)	8000 - 18,000	3 of 3 samples 2 of 2 events	Not attaining	
			Copper (total) µg/L	1300 (FBC)	8600 - 18,000	3 of 3	Inconclusive (Not attaining")	
			pH SU	8.5 - 9.0 (A&Ww, FBC)	3.3	1 of 1	Inconclusive (Not attaining")	



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
			Zinc (dissolved) µg/L	varies by hardness (A&Ww acute)	3200 - 11,000	3 of 3 samples 2 of 2 events (in 1998 - 2000)	Not attaining	
				varies by hardness (A&Ww chronic)	3200 - 11,000	3 of 3 samples 2 of 2 events	Not attaining	
Cox Gulch, unnamed tributary of headwaters-Cox Gulch AZ15050301-877 A&We, PBC (tributary rule)	ADEQ TMDL Program Above Cox Gulch SCUCX000.01	1999 - 1 partial suite	Copper (dissolved) µg/L	varies by hardness (A&We)	7600	1 of 1		
			Copper (total) µg/L	1300 (PBC)	7600	1 of 1		
			Zinc (dissolved) µg/L	varies by hardness (A&We)	2900	1 of 1		
	Summary Row A&We Not attaining PBC Not attaining	1999 1 sampling event	Copper (dissolved) µg/L	varies by hardness (A&We)	7600	1 of 1 event (in 1999)	Inconclusive (Not attaining*)	Insufficient monitoring data to assess. Copper and zinc loadings from this reach were addressed in the TMDL for Thres R Canyon approved by EPA in 2003.  *Although current data copper and zinc are "inconclusive," the uses are assessed as "not attaining" until data indicate that all uses are being attained for parameters addressed in the TMDL.
			Copper (total) µg/L	1300 (PBC)	7600	1 of 1	Inconclusive (Not attaining*)	
			Zinc (dissolved) µg/L	varies by hardness (A&We)	2900	1 of 1 event (in 1999)	Inconclusive (Not attaining*)	
Harshaw Creek headwaters-Sonoita Creek AZ15050301-025 A&We, PBC, AgL	ADEQ TMDL Program Below unnamed trib (Endless Chain trib) SCHRC013.63	1999 - 1 partial suite	Copper (dissolved) µg/L	varies by hardness (A&We)	62	1 of 1		
			pH SU	6.5 - 9.0 (A&We, PBC, AgL)	4.6	1 of 1		
	ADEQ TMDL Program Below Trench Camp Mine SCHRC011.56	1998 - 3 partial suites	No exceedances					ADEQ collected 4 samples at 2 sites in 1998-1999. TMDLs for copper, zinc, and low pH were approved by EPA in 2003. Assessed as "not attaining" due to copper exceedances and low pH.  *Although current copper and pH data are inconclusive, this reach will remain "not attaining" until all uses are being attained for parameters addressed in the TMDLs.  Placed on the Planning List for TMDL follow-up monitoring and missing core parameter: total lead.
	Summary Row A&We Not attaining PBC Not attaining AgL Not attaining	1998 - 1999 4 samples 4 sampling events	Copper (dissolved) µg/L	varies by hardness (A&We)	<15 - 62	1 of 4 samples 1 of 4 events (in 1999)	Inconclusive (Not attaining*)	
			pH SU	6.5 - 9.0 (A&We, PBC, AgL)	4.6 - 7.5	1 of 4	Inconclusive (Not attaining*)	



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
Harshaw Creek, unnamed tributary of (Endless Chain Mine trib) headwaters-Harshaw Creek AZ15050301-888 A&We, PBC (tributary rule)	ADEQ TMDL Program Above mined area SCUHR00.56	1999 - 2 partial suites	pH SU	6.5 - 9.0 (A&We, PBC, AgL)	5.2 - 6.3	1 of 2		
	ADEQ TMDL Program Above Endless Chain Mine SCUHR000.38	1999 - 1 partial suite	pH SU	6.5 - 9.0 (A&We, PBC, AgL)	6.2	1 of 1		
	Summary Row  A&We Not attaining PBC Not attaining	1999  3 samples 2 sampling events	pH SU	6.5 - 9.0 (A&We, PBC)	5.2 - 6.3	1 of 3	Inconclusive (Not attaining*)	*Loadings (pH) from this reach were addressed in the TMDL for Harshaw Creek approved by EPA in 2003. Although current pH data are inconclusive, the assessment will remain "not attaining" until data indicate that all uses are being attained for parameters addressed in the TMDL.
Humboldt Canyon headwaters - Alum Gulch AZ15050301-340 A&Ww, FBC, FC (tributary rule)	ADEQ TMDL Program Intersection with jeep road SCHMC002.41	1999 - 1 partial suite	Cadmium (dissolved) µg/L	varies by hardness (A&Ww acute)	2.8	1 of 1		
				varies by hardness (A&Ww chronic)		1 of 1		
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	540	1 of 1		
				varies by hardness (A&Ww chronic)		1 of 1		
			Copper (total) µg/L	500 (AgL)	550	1 of 1		
			pH SU	6.5 - 9.0 (A&Ww, PBC, AgL)	3.3	1 of 1		
	ADEQ TMDL Program Base of falls Above Humboldt well SCHMC001.27	1999 - 1 partial suite	Zinc (dissolved) µg/L	varies by hardness (A&Ww acute)	210	1 of 1		
				varies by hardness (A&Ww chronic)		1 of 1		
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	140	1 of 1		
				varies by hardness (A&Ww chronic)		1 of 1		
			pH SU	6.5 - 9.0 (A&We, PBC, AgL)	3.6	1 of 1		
			Zinc (dissolved) µg/L	varies by hardness (A&Ww acute)	85	1 of 1		
				varies by hardness (A&Ww chronic)		1 of 1		



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	<b>Summary Row</b>  A&Ww Not attaining FC Inconclusive FBC Not attaining	1999  2 samples 1 sampling event	Cadmium (dissolved) µg/L	varies by hardness (A&Ww acute)	2.8	2 of 2 samples 1 of 1 event (in 1999)	Inconclusive (Not attaining*)	Insufficient monitoring data to assess. Cadmium, copper, zinc and pH loadings from this tributary were addressed in the Alum Gulch TMDLs approved by EPA in 2003.  *Although current data for cadmium, copper, pH and zinc are "inconclusive," assessments will remain "not attaining" until data indicate that all uses are being attained for parameters addressed in the TMDL.  Placed on the Planning List for TMDL follow-up monitoring.
				varies by hardness (A&Ww chronic)		2 of 2 samples 1 of 1 event	Inconclusive (Not attaining*)	
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	140 - 540	2 of 2 samples 1 of 1 event (in 1999)	Inconclusive (Not attaining*)	
				varies by hardness (A&Ww chronic)		2 of 2 samples 1 of 1 event	Inconclusive (Not attaining*)	
			pH SU	8.5 - 9.0 (A&Ww, FBC)	3.3 - 3.8	2 of 2	Inconclusive (Not attaining*)	
			Zinc (dissolved) µg/L	varies by hardness (A&Ww acute)	85 - 210	2 of 2 samples 1 of 1 event (in 1999)	Inconclusive (Not attaining*)	
				varies by hardness (A&Ww chronic)		2 of 2 samples 1 of 1 event	Inconclusive (Not attaining*)	
Loma Verde Wash headwaters - unnamed trib to Tanque Verde Wash AZ15050302-268 A&Ww, PBC (tributary rule)	USGS Ambient Monitoring At Saguaro National Park SCLMV003.51 101585	2002 - 1 partial suite	No exceedances					
	USGS Ambient Monitoring At Saguaro National Park SCLMV003.50 101594	2002 - 1 partial suite	No exceedances					
	<b>Summary Row</b> A&Ww Inconclusive PBC Inconclusive	2002  2 sampling events	No exceedances					Insufficient monitoring data to assess.
Madera Canyon Creek headwaters - tributary at 31°43'42"/110°52'50" AZ15050301-322A A&Ww, FC, FBC, AgL	ADEQ Ambient Monitoring 1 mile Below Sprung Spring SCMD007.63 100588	2001 - 1 partial suite	No exceedances					
	<b>Summary Row</b> A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	2001  1 sampling event	No exceedances					ADEQ collected 1 sample in 2002. Assessed as "Inconclusive" due to insufficient monitoring events.
Madrona Creek headwaters - Rincon Creek AZ15050302-138 A&Ww, FC, FBC (tributary rule)	USGS Ambient Monitoring Near Madrona Ranger Station SCMDN001.32 101828	2002 - 1 partial suite	No exceedances					
	<b>Summary Row</b> A&Ww Inconclusive FC Inconclusive FBC Inconclusive	2002  1 sampling event	No exceedances					USGS collected samples 1 sample in 2002. Assessed as "Inconclusive" due to insufficient monitoring events.



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					COMMENTS	
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT		
Nogales and East Nogales Wash Mexico border - Potrero Creek AZ15050301-011 A&Ww, PBC	ADEQ Fixed Station Network At Morley Street tunnel SCNGW004.23 100251	1998 - 3 full + 1 partial suite 1999 - 2 full + 2 partial suites 2000 - 3 full + 1 partial suite 2001 - 4 full suites 2002 - 1 full + 3 partial suites	Ammonia mg/L	varies by hardness (A&Ww chronic)	<0.02 - 9	4 of 18			
			Chlorine (total residual) µg/L	11 (A&Ww acute)	70 - 2830	12 of 12			
				5 (A&Ww chronic)		12 of 12			
			Chromium (total) µg/L	100 (PBC)	<10 - 250	1 of 18			
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	<10 - 24	1 of 18			
				varies by hardness (A&Ww chronic)		2 of 18			
			Dissolved oxygen mg/L	>6.0 (90% saturation) (A&Ww)	4.4 - 9.8 (63 - 108%)	3 of 18			
			<i>Escherichia coli</i> CFU/100 ml	576 (PBC)	<2 - too numerous to count	9 of 14			
			Lead (total) µg/L	15 (PBC)	<5 - 190	2 of 18			
	Turbidity (former standard) NTU	50 (A&Ww)	2 - 2730	5 of 18					
	ADEQ Ambient Monitoring South of Rte. 82 overpass to E. Calle Sonora Rd. bridge (5 sites) SCNGW003.8 - SCNGW001.7	1998 - 1 chlorine	Chlorine (total residual) µg/L	11 (A&Ww acute)	50 - 380	5 of 5			
				5 (A&Ww chronic)		5 of 5			
	Summary Row		1998 - 2002	Ammonia mg/L	varies by hardness (A&Ww chronic)	<0.02 - 9	4 of 18 samples 4 of 18 events	Impaired	ADEQ collected 21 samples at 2 sites in 1998 - 2002. Assessed as "impaired" due to ammonia, chlorine, copper, and <i>Escherichia coli</i> exceedances.  Placed on the Planning List due to turbidity exceedances. Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.
	A&Ww PBC	Impaired Impaired	21 samples 21 sampling events	Chlorine (total residual) µg/L	11 (A&Ww acute)	70 - 2830	17 of 17 samples 12 of 12 events (1998-2001)	Impaired	
					5 (A&Ww chronic)		17 of 17 samples 12 of 12 events	Impaired	
Chromium (total) µg/L				100 (PBC)	<10 - 250	1 of 18	Attaining		



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	<10 - 24	1 of 18 samples 1 of 18 events (last 3 years with no acute exceedances)	Attaining	
				varies by hardness (A&Ww chronic)		2 of 18 samples 2 of 18 events	Impaired	
			Dissolved oxygen mg/L	>8.0 (90% saturation) (A&Ww)	4.4 - 9.8 (63 - 108%)	3 of 18	Attaining	
			Escherichia coli CFU/100 ml	576 (PBC)	<2 - too numerous to count	9 of 14 samples 9 of 14 events (exceedances every year)	Impaired	
			Lead (total) µg/L	15 (PBC)	<5 - 199	2 of 18	Attaining	
			Turbidity (former standard) NTU	50 (A&Ww)	2 - 2730	5 of 18	Inconclusive	
Potrero Creek Interstate19 - Santa Cruz River AZ15050301-500B A&Ww, FC, FBC, AgL	ADEQ Ambient Monitoring 0.3 miles north of Nogales Fire Station B SCPOT003.5 100705	1998 - 1 chlorine	Chlorine (total residual) µg/l	11 (A&Ww acute)	30	1 of 1		
				5 (A&Ww chronic)		1 of 1		
	ADEQ Ambient Monitoring Half mile north of Nogales suburban Fire Station B SCPOT003.38 100207	1998 - 1 partial suite	No exceedances					
	ADEQ Ambient Monitoring Bridge on Old Tucson Road SCPOT001.9 100703	1998 - 1 chlorine	Chlorine (total residual) µg/L	11 (A&Ww acute)	80	1 of 1		
				5 (A&Ww chronic)		1 of 1		
	Friends of the Santa Cruz At Ruby Road SCPOT001.53 100571	1998 - 12 partial suites 1999 - 7 partial suites 2000 - 11 partial suites 2001 - 7 partial suites	Dissolved oxygen mg/L	>8.0 (90% saturation) (A&Ww)	0.5 - 14	3 of 31		
			Turbidity (former standard) NTU	50 (A&Ww)	2 - 200	1 of 15		
	ADEQ Ambient Monitoring Above Wastewater Treatment Plant SCPOT000.72 100208	1998 - 1 partial suite	Chlorine (total residual) µg/L	11 (A&Ww acute)	80	1 of 1		
				5 (A&Ww chronic)		1 of 1		



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
			Copper (dissolved) µg/L	varies by hardness (A&Ww chronic)	17	1 of 1		
	ADEQ Ambient Monitoring At Santa Cruz River SCPOT000.1 100702	1998 - 1 chlorine	Chlorine (total residual) µg/L	11 (A&Ww acute)	800	1 of 1		
				5 (A&Ww chronic)		1 of 1		
	Summary Row  A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1998 - 2001  47 samples 43 sampling events	Chlorine (total residual) µg/L	11 (A&Ww acute)	30 - 800	4 of 4 samples 1 of 1 event (in 1998)	Inconclusive	ADEQ and Friends of the Santa Cruz River (a volunteer monitoring group) collected 47 samples at 6 sites in 1998-2001. Assessed as "Inconclusive" and placed on the Planning List due to: 1. Chlorine exceedance, 2. Copper exceedance, 3. Missing core parameters: dissolved metals (cadmium, copper, and zinc) and total metals (mercury, lead, and copper).
				5 (A&Ww chronic)	30 - 800	4 of 4 samples 1 of 1 event	Inconclusive	
			Copper (dissolved) µg/L	varies by hardness (A&Ww chronic)	17	1 of 1 sample 1 of 2 events	Inconclusive	
			Dissolved oxygen mg/L	>6.0 (90% saturation) (A&Ww)	0.5 - 14	3 of 33	Attaining	
			Turbidity (former standard) NTU	50 (A&Ww)	2 - 200	1 of 17	Attaining	
	Redrock Canyon Creek headwaters - Harshaw Creek AZ15050301-576 A&Ww, FBC, FC	2000 - 1 full suite 2001 - 4 full suites	Dissolved oxygen mg/L	>6.0 (90% saturation) (A&Ww)	5.2 - 10.0 (71 - 110%)	1 of 4		Low dissolved oxygen due to natural drying of the stream and not anthropogenic causes. Not considered in final assessment.
	Summary Row A&Ww Attaining FBC Attaining FC Attaining	2000 - 2001  5 samples 5 sampling events	No exceedances					ADEQ collected 5 samples in 2000-2001. Assessed as "attaining all uses."
Sabino Canyon Creek tributary at 32°23'28"N 110°47'00"W - Tanque Verde Wash AZ15050302-014B A&Ww, FC, FBC, DWS, AgL	ADEQ Ambient Monitoring Above East Fork Sabino Cyn SCSAB007.56 100635	2001 - 1 partial suite	No exceedances					Low dissolved oxygen due to low flow conditions and not anthropogenic causes. Not considered in final assessment.
	ADEQ Ambient Monitoring Near Tucson SCSAB004.39 101152	2000 - 1 full suite 2001 - 3 full suites	Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	5.7 - 10.5 (72 - 97%)	1 of 4		Lab detection limits for cadmium, copper, and zinc were too high to use results for assessment.
	Summary Row  A&Ww Inconclusive FC Attaining FBC Attaining DWS Attaining AgL Attaining	2000 - 2001  5 samples 4 sampling events	No exceedances					ADEQ collected 5 samples at 2 sites in 2000-2001. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: dissolved metals (cadmium, copper, zinc).
Santa Cruz River headwaters - Mexico border AZ15050301-288 A&Ww, FC, FBC, AgL, AgL	Friends of the Santa Cruz River Near Lochiel SCSCR099.03 100242	2000 - 1 full suite 2001 - 3 full suites	No exceedances					



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row A&Ww    Attaining FC        Attaining FBC       Attaining Agl       Attaining Agl       Attaining	2000 - 2001  4 sampling events	No exceedances					Friends of the Santa Cruz River (a volunteer monitoring group) collected 4 samples in 2000-2001. Assessed as "attaining all uses."
Santa Cruz River Mexican border - Nogales WWTP AZ15050301-010 A&Ww, FC, FBC, DWS, Agl, Agl	ADEQ Ambient Monitoring At International Boundary SCSCR097.28 100239	1998 - 1 partial suite 1999 - 2 full suites 2000 - 4 full suites 2001 - 4 full suites	Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	4.3 - 10.0 (84 - 113%)	2 of 11		
			Escherichia coli CFU/100 ml	235 (FBC)	<2 - 10,000	2 of 11		
			Lead (total) µg/L	15 (DWS, FBC)	<5 - 62	1 of 11		
			Manganese (total) µg/L	980 (DWS)	<50 - 1500	1 of 11		
			Mercury (total) µg/L	0.6 (FC)	<0.5 - 0.8	1 of 11		
			Turbidity (former standard) NTU	50 (A&Ww)	0.98 - 1854	1 of 9		
	Friends of the Santa Cruz River At Guevavi Ranch SCSCR091.90 100246	1998 - 2 partial suites 1999 - 4 partial suites 2000 - 6 partial suites 2001 - 4 partial suites	Turbidity (former standard) NTU	50 (A&Ww)	2 - 200	1 of 9		
	Summary Row  A&Ww    Attaining FC        Attaining FBC       Impaired DWS       Attaining Agl       Attaining Agl       Attaining	1998 - 2001  27 samples 16 sampling events	Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	4.3 - 10.0 (84 - 113%)	2 of 20	Attaining	ADEQ and Friends of the Santa Cruz River (a volunteer monitoring group) collected 27 samples at 2 sites in 1998-2001. Assessed as "impaired" due to Escherichia coli exceedances.
	Escherichia coli CFU/100 ml	235 (FBC)	<2 - 10,000	2 of 23 samples 2 of 20 events (occurred in 1998 and 2000)	Impaired			
	Lead (total) µg/L	15 (DWS, FBC)	<5 - 62	1 of 15	Attaining			
	Manganese (total) µg/L	980 (DWS)	<50 - 1500	1 of 15	Attaining			
	Mercury (total) µg/L	0.6 (FC)	<0.5 - 0.8	1 of 15	Attaining			
	Turbidity (former standard) NTU	50 (A&Ww)	0.25 - 200	2 of 22	Attaining			



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
Santa Cruz River Nogales WWTP - Josephine Cyn. AZ15050301-009 A&Wedw, PBC, AgL	Friends of the Santa Cruz River At Rio Rico SCSCR087.08 100238	1998 - 12 partial suites 1999 - 5 partial suites 2000 - 9 partial suites 2001 - 7 partial suites	Turbidity (former standard) NTU	50 (A&Wedw)	3 - 200	1 of 15		
	Summary Row  A&Wedw Inconclusive PBC Attaining AgL Inconclusive	1998 - 2001  33 sampling events	Turbidity (former standard) NTU	50 (A&Wedw)	3 - 200	1 of 11	Attaining	Friends of the Santa Cruz River (a volunteer monitoring group) collected 33 samples in 1998-2001. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: dissolved metals (cadmium, copper, and zinc) and total metals (copper and lead).
Santa Cruz River Josephine Canyon - Tubac bridge AZ15050301-008A A&Wedw, PBC, AgL	Friends of the Santa Cruz River At Santa Gertrudis Lane SCSCR080.50 100247	1998 - 12 partial suites 1999 - 12 partial suites 2000 - 11 partial suites 2001 - 9 partial suites	Turbidity (former standard)	50 (A&Wedw)	14 - 200	8 of 20		
	ADEQ Ambient Monitoring Near Tubac SCSCR080.45 101002	2000 - 1 full suite 2001 - 1 full suite	Chlorine (total residual) µg/L	11 (A&Wedw acute)	90	1 of 1		
				5 (A&Wedw chronic)		1 of 1		
	Summary Row  A&Wedw Inconclusive PBC Attaining AgL Inconclusive	1998 - 2001  46 samples 45 sampling events	Chlorine (total residual) µg/L	11 (A&Wedw acute)	90	1 of 1 event (In 2001)	Inconclusive	ADEQ and Friends of the Santa Cruz River (a volunteer monitoring group) collected 46 samples at 2 sites in 1998-2001. Assessed as "attaining some uses" and placed on the Planning List due to: 1. Chlorine exceedance. 2. Missing core parameters: dissolved metals (cadmium, copper, and zinc) and total metals (copper and lead). 3. Former turbidity standard exceedances. Monitoring will be scheduled to determine whether bottom deposit violations are occurring.
				5 (A&Wedw chronic)	90	1 of 1 event	Inconclusive	
			Turbidity (former standard) NTU	50 (A&Wedw)	14 - 200	8 of 20	Inconclusive (see comment*)	
Santa Cruz River Tubac bridge - Soporí Wash AZ15050301-008B A&We, PBC, AgL	Friends of the Santa Cruz R. North of Chavez Sliding Rd. SCSCR081.34 100244	1998 - 10 partial suites 1999 - 12 partial suites 2000 - 11 partial suites 2001 - 9 partial suites	pH SU	6.5 - 9.0 (A&We, PBC, AgL)	2.6 - 8.0	1 of 34		
	Summary Row  A&We Inconclusive PBC Attaining AgL Inconclusive	1998 - 2001  42 samples 42 sampling events	pH SU	6.5 - 9.0 (A&We, PBC, AgL)	2.6 - 8.0	1 of 34	Attaining	Friends of the Santa Cruz River (a volunteer monitoring group) collected 42 samples in 1998 - 2001. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: dissolved metals (cadmium, copper, and zinc) and total metals (copper and lead).



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
Santa Cruz River Roger Rd. WWTP outfall - Rillito Creek AZ15050301-003B A&We, PBC	Pima County Wastewater Management Department SC-01 SCSCR033.90	2001 - 3 dissolved oxygen	No exceedances					
	Pima County Wastewater Management Department SC-02 SCSCR032.49	2001 - 2 dissolved oxygen	No exceedances					
	Summary Row  A&Wedw Inconclusive PBC Inconclusive	2001  5 samples 3 sampling events	No exceedances					Pima County collected 5 samples at 2 sites in 2001. Assessed as "inconclusive" and placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> , pH, and dissolved metals (cadmium, copper, and zinc).
Santa Cruz River Canada del Oro - HUC boundary 15050303 AZ15050301-001 A&Wedw, PBC	Pima County Wastewater Management Department SC-03 SCSCR030.15	2001 - 3 dissolved oxygen	No exceedances					
	Pima County Wastewater Management Department SC-04 SCSCR028.64	2001 - 1 dissolved oxygen	No exceedances					
	Pima County Wastewater Management Department SC-05 SCSCR027.69	2001 - 3 dissolved oxygen	No exceedances					
	Pima County Wastewater Management Department SC-06 SCSCR026.80	2001 - 1 dissolved oxygen	No exceedances					
	ADEQ Ambient Monitoring Near Marana SCSCR025.40 101081	2001 - 4 full suites	Chlorine (total residual) µg/L	11 (A&Wedw acute)	0 - 480	1 of 2		
				5 (A&Wedw chronic)		1 of 2		
	Pima County Wastewater Management Department SC-07 SCSCR025.17	2001 - 2 dissolved oxygen	No exceedances					
	Summary Row  A&Wedw Inconclusive PBC Attaining	2001  14 samples 9 sampling events	Chlorine (total residual) µg/L	11 (A&Wedw acute)	0 - 480	1 of 2 samples 1 of 2 events (in 2001)	Inconclusive	ADEQ and Pima County collected a total of 14 samples at 6 sites in 2001. Assessed as "attaining some uses" and placed on the Planning List due to chlorine exceedance.
		5 (A&Wedw chronic)		0 - 480	1 of 2 samples 1 of 2 events	Inconclusive		



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
Santa Cruz River HUC boundary 15050303 - Baumgartner Rd. AZ15050303-005A A&Wedw, PBC	Pima County Wastewater Management Department SC-08 SCSCR024.30	2001 - 3 dissolved oxygen	No exceedances					
	Pima County Wastewater Management Department SC-09 SCSCR022.19	2001 - 3 dissolved oxygen	No exceedances					
	Pima County Wastewater Management Department SC-10 SCSCR021.50	2001 - 3 dissolved oxygen	No exceedances					
	Pima County Wastewater Management Department SC-11 SCSCR019.39	2001 - 3 dissolved oxygen	No exceedances					
	Pima County Wastewater Management Department SC-12 SCSCR017.96	2001 - 3 dissolved oxygen	No exceedances					
	Summary Row  A&Wedw Inconclusive PBC Inconclusive	2001  15 samples 8 sampling events	No exceedances					Pima County collected 15 samples at 5 sites in 2001. Assessed as "Inconclusive" and placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> , pH, and dissolved metals (cadmium, copper, and zinc).
Sonoita Creek 750 feet below WWTP - Santa Cruz AZ15050301-013C A&Ww, FC, FBC, AgI, AgL	ADEQ Ambient Monitoring At Circle Z Ranch SCSON007.09 101154	2000 - 1 full suite 2001 - 3 full suites	Copper (dissolved) µg/L	varies by hardness (A&Ww chronic)	<10 - 34	1 of 4		
			Zinc (dissolved) µg/L	varies by hardness (A&Ww acute)		2 of 4		
				varies by hardness (A&Ww chronic)		2 of 4		
	ADEQ TMDL Program Above Temporal Gulch, Below spring at Nature Cons. SCSON015.6	1996 - 3 partial suites	Dissolved oxygen mg/l	>6.0 (90% saturation) (A&Ww)	5.2 - 7.3 (64 - 81%)	1 of 3		Low dissolved oxygen due to naturally occurring ground water upwelling, and not anthropogenic causes. Not included in final assessment.



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row	1998 - 2001 7 sampling events	Copper (dissolved) µg/L	varies by hardness (A&Wschw chronic)	<10 - 34	1 of 4 events	Inconclusive	ADEQ collected 7 samples in 1998-2001. Assessed as "Impaired" due to zinc exceedances.
	A&Ww FC PBC Agl Agl	Impaired Attaining Attaining Attaining Attaining	Zinc (dissolved) µg/L	varies by hardness (A&Wschw acute)	57 - 880	2 of 4 events (in 2000-2001)	Impaired	Placed on the Planning List due to copper exceedance.
				varies by hardness (A&Wschw chronic)	67 - 880	2 of 4 events	Impaired	Reach was erroneously delisted for dissolved oxygen in 2002; however, the reach is expected to attain standards after more appropriate designated uses are assigned in rule. Reach is "not attaining" for dissolved oxygen.
Sycamore Canyon Creek headwaters - Mexico border AZ15080200-002 A&Ww, FC, FBC, AgL	ADEQ Ambient Monitoring Above Penasco Canyon RMSYC002.33 100880	2001 - 1 partial suite	No exceedances					
	Summary Row A&Ww FC FBC Agl	2001 1 sampling event	No exceedances					Insufficient monitoring data to assess.
Three R Canyon headwaters - 31 28°35'110 46°19" AZ15050301-558A A&We, PBC, AgL	ADEQ TMDL Program Above 3R Mine, south branch SCTHC004.50	1999 - 1 partial suite	Copper (dissolved) µg/L	varies by hardness (A&We)	380	1 of 1		
			pH SU	6.5 - 9.0 (A&We, PBC, AgL)	3.7	1 of 1		
	ADEQ TMDL Program Above most upstream springs, below 3R mine SCTHC004.07	1999 - 1 partial suite	Copper (dissolved) µg/L	varies by hardness (A&We)	7200	1 of 1		
			Copper (total) µg/L	500 (Agl)	7700	1 of 1		
			pH SU	6.5 - 9.0 (A&We, PBC, AgL)	3.5	1 of 1		
	Summary Row A&We PBC Agl	1999 2 samples 1 sampling event	Copper (dissolved) µg/L	varies by hardness (A&We)	380 - 7200	2 of 2 samples 1 of 1 event (in 1999)	Inconclusive (Not attaining)	Insufficient monitoring data to assess. TMDLs for cadmium, copper, zinc, and pH were approved by EPA in 2003.
			pH SU	6.5 - 9.0 (A&We, PBC, AgL)	3.7	2 of 2	Inconclusive (Not attaining)	*Although current pH and copper data are inconclusive, designated uses will remain "not attaining" until data indicate that all uses are being attained for all parameters addressed in the TMDL.  Placed on the Planning List for TMDL follow-up monitoring.
Three R Canyon 31 28°35'110 46°19"- 31 28°27'110 47°12" AZ15050301-558B A&Ww, FC, FBC, AgL	ADEQ TMDL Program Below most upstream springs SCTHC004.01	1998 - 3 partial suites	Cadmium (dissolved) µg/L	varies by hardness (A&Ww acute)	35 - 59	5 of 5		
		1999 - 1 partial suite 2000 - 1 partial suite		varies by hardness (A&Ww chronic)		5 of 5		



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
			Cadmium (total) µg/L	50 (AgL)	40 - 54	2 of 5		
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	44,000 - 71,900	5 of 5		
				varies by hardness (A&Ww chronic)		5 of 5		
			Copper (total) µg/L	1300 (FBC)	45,200 - 66,100	5 of 5		
				500 (AgL)		5 of 5		
			pH SU	6.5 - 9.0 (A&Ww, FBC, AgL)	2.9 - 3.1	4 of 4		
			Zinc (dissolved) µg/L	varies by hardness (A&Ww acute)	850 - 1750	5 of 5		
				varies by hardness (A&Ww chronic)		5 of 5		
	Summary Row  A&Ww Not attaining FC Inconclusive FBC Not attaining AgL Not attaining	1996 - 2000  5 samples 5 sampling events	Cadmium (dissolved) µg/L	varies by hardness (A&Ww acute)	35 - 59	5 of 5 events (1996-2000)	Not attaining	ADEQ collected 5 samples in 1996-2000. TMDLs for cadmium, copper, zinc, and pH were approved by EPA in 2003. Assessed as "not attaining" due to cadmium, copper and zinc exceedances, and low pH.  *Although current data for some designated uses are inconclusive, the reach will remain "not attaining" until data indicate that all uses are being attained for parameters addressed in the TMDL.  Placed on the Planning List for TMDL follow-up monitoring and missing core parameters: <i>Escherichia coli</i> , total lead, total mercury, and turbidity/SSC.
				varies by hardness (A&Ww chronic)	35 - 59	5 of 5 events	Not attaining	
			Cadmium (total) µg/L	50 (AgL)	40 - 54	2 of 5	Inconclusive (Not attaining*)	
			Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	44,000 - 71,900	5 of 5 events (in 1996-2000)	Not attaining	
				varies by hardness (A&Ww chronic)	44,000 - 71,900	5 of 5 events	Not attaining	
			Copper (total) µg/L	1300 (FBC)	45,200 - 66,100	5 of 5	Inconclusive (Not attaining*)	
				500 (AgL)	45,200 - 66,100	5 of 5	Inconclusive (Not attaining*)	
			pH SU	6.5 - 9.0 (A&Ww, FBC, AgL)	2.9 - 3.1	4 of 5	Inconclusive (Not attaining*)	
			Zinc (dissolved) µg/L	varies by hardness (A&Ww acute)	850 - 1750	5 of 5 events (in 1996-2000)	Not attaining	
				varies by hardness (A&Ww chronic)	850 - 1750	5 of 5 events	Not attaining	



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
Three R Canyon 31 28°27'110 47°12" - Sonoita Creek AZ15050301-558C A&We, PBC, AgL	ADEQ TMDL Program Below Cox Gulch SCTHC003.03	1998 - 2 partial suites	Copper (dissolved) µg/L	varies by hardness (A&We)	12,500 - 38,200	2 of 2		
			Copper (total) µg/L	1300 (PBC)	14,800 - 34,500	2 of 2		
				500 (AgL)		2 of 2		
			pH SU	6.5 - 9.0 (A&We, PBC, AgL)	3.4 - 3.9	2 of 2		
			Zinc (dissolved) µg/L	varies by hardness (A&We)	920 - 5010	1 of 2		
	Summary Row  A&We Not attaining PBC Not attaining AgL Not attaining	1998  2 samples 2 sampling events	Copper (dissolved) µg/L	varies by hardness (A&We)	12,500 - 38,200	2 of 2 events (in 1998)	Not attaining	insufficient monitoring data to assess. TMDLs for cadmium, copper, zinc, and pH were approved by EPA in 2003.
			Copper (total) µg/L	1300 (PBC)	14,800 - 34,500	2 of 2	inconclusive (Not attaining")	*Although current data for pH and zinc are "inconclusive," assessments will remain "not attaining" until data indicate that all uses are being attained for parameters addressed in the TMDL.  Placed on the Planning List for TMDL follow-up monitoring.
				500 (AgL)		2 of 2	inconclusive (Not attaining")	
			pH SU	6.5 - 9.0 (A&We, PBC, AgL)	3.4 - 3.9	2 of 2	inconclusive (Not attaining")	
			Zinc (dissolved) µg/L	varies by hardness (A&We)	920 - 5010	1 of 2 (in 1998)	inconclusive (Not attaining")	
Three R Canyon - <u>unnamed</u> tributary of headwaters - Three R Canyon AZ15050301-889 A&We, PBC (tributary rule)	ADEQ TMDL Program Upstream from 3R Mine, north tributary SCUTH00.30	1999 - 1 partial suite	Copper (dissolved) µg/L	varies by hardness (A&We)	1400	1 of 1		
			pH SU	6.5 - 9.0 (A&We, PBC)	3.8	1 of 1		
	Summary Row  A&We Not attaining PBC Not attaining	1999  1 sampling event	Copper (dissolved) µg/L	varies by hardness (A&We)	1400	1 of 1 (in 1999)	inconclusive (Not attaining")	insufficient monitoring data to assess. Copper and pH loading from this reach were addressed in the Three R Canyon TMDL approved by EPA in 2003.
			pH SU	6.5 - 9.0 (A&We, PBC)	3.8	1 of 1	inconclusive (Not attaining")	*Although current copper and pH data are "inconclusive," assessments will remain "not attaining" until data indicate that all uses are being attained for parameters addressed in the TMDL.



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
LAKE MONITORING DATA								
Arivaca Lake AZL15050304-0080 A&Ww, FC, FBC, Agl, AgL	ADEQ Lakes Program Routine Monitoring SCARI-A 100000	1998 - 3 partial suites 2000 - 1 partial suite 2001 - 3 full suites	Dissolved oxygen mg/L	>8.0 (A&Ww)	1.8 - 12.9 (25 - 150%)	1 of 7		
			pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, Agl)	6.3 - 9.5	1 of 7		
			Selenium (total) µg/L	2.0 (A&Ww chronic)	<2 - 7	1 of 7		
	Summary Row  A&Ww Inconclusive FC Not attaining FBC Inconclusive Agl Inconclusive Agl Inconclusive	1998 - 2001  7 samples 7 sampling events	Dissolved oxygen mg/L	>8.0 (A&Ww)	1.8 - 12.9 (25 - 150%)	1 of 7	Inconclusive	ADEQ collected 7 samples in 1998-2001. Assessed as "not attaining" due to mercury in fish tissue.  *A TMDL for mercury in fish tissue was approved by EPA in 1999. The lake will remain "not attaining" until sufficient data are collected to indicate that mercury in fish tissue is no longer a concern.  Placed on the Planning List due to a fish kill in 1986. Fish kill may be evidence of a narrative standard violation.
			pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, Agl)	6.3 - 9.5	1 of 7	Inconclusive	
			Selenium (total) µg/L	2.0 (A&Ww chronic)	<2 - 7	1 of 7 events	Inconclusive	Also placed on the Planning List for TMDL follow-up monitoring, low dissolved oxygen, high pH, selenium exceedances, and missing core parameters: <i>Escherichia coli</i> and dissolved metals (cadmium, copper, and zinc).
Kennedy Lake AZL15050301-0720 A&Ww, FC, PBC	AGFD Urban Lakes Study SCKEN-A 100026	1998 - 11 field	No exceedances					
	AGFD Urban Lakes Study SCKEN-B 101052	1998 - 11 field	pH	6.5 - 9.0 (A&Ww, PBC)	8.5 - 9.3	1 of 11		
	AGFD Urban Lakes Study SCKEN-AB	1998 - 4 partial suites	No exceedances					
	Summary Row  A&Ww Inconclusive FC Attaining PBC Inconclusive	1998  26 samples 11 sampling events	pH SU	6.5 - 9.0 (A&Ww, PBC)	8.5 - 9.3	1 of 11	Attaining	AGFD collected 26 samples at 3 sites in 1998. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> and dissolved metals (cadmium, copper, and zinc).
Lakeside Lake AZL15050302-0760 A&Ww, FC, PBC	AGFD Urban Lakes Study SCLAK-A 100034	1998 - 12 partial suites	Dissolved oxygen mg/L	>8.0 (90% saturation) (A&Ww)	2.4 - 17.1 (32 - 176%)	2 of 12		
			pH SU	6.5 - 9.0 (A&Ww, PBC)	7.3 - 9.9	2 of 12		
	Univ. of Arizona Lake Study Site A	1998 - 11 partial suites	Ammonia mg/L	varies by pH and temperature (A&Ww)	1.05 - 1.4	1 of 10		
			Dissolved oxygen mg/L	>8.0 (A&Ww)	1.6 - 19.5	3 of 10		
			pH SU	6.5 - 9.0 (A&Ww, PBC)	6.8 - 9.5	1 of 10		



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	AGFD Urban Lakes Study and Routine Monitoring SCLAK-B 100035	1998 - 11 partial suites 2002 - 2 partial suites	Turbidity (former standard) NTU	25 (A&Ww)	6 - 300	7 of 10		
			Dissolved oxygen mg/L	>6.0 (A&Ww)	1.5 - 14.4 (18 - 149%)	2 of 11		
			pH SU	6.5 - 9.0 (A&Ww, PBC)	7.5 - 9.8	1 of 11		
	AGFD Urban Lakes Study SCLAK-AB 101059	1998 - 4 partial suites	No exceedances					
	Univ. of Arizona Lake Study Site H	1998 - 11 partial suites	Ammonia mg/L	varies by pH and temperature (A&Ww)	0.2 - 1.5	2 of 11		
			Dissolved oxygen mg/L	>6.0 (A&Ww)	1.0 - 17.1	5 of 11		
			Turbidity (former standard) NTU	25 (A&Ww)	0.2 - 380	7 of 11		
	Univ. of Arizona Lake Study Site I	1998 - 11 partial suites	Ammonia mg/L	varies by pH and temperature (A&Ww)	0.3 - 2.4	1 of 11		
			Dissolved oxygen mg/L	>6.0 (A&Ww)	1.0 - 19.2	4 of 11		
			pH SU	6.5 - 9.0 (A&Ww, PBC)	7.3 - 9.4	1 of 11		
			Turbidity (former standard) NTU	25 (A&Ww)	0.2 - 500	7 of 11		
	Summary Row  A&Ww Impaired FC Attaining PBC Inconclusive	1998 - 2002  55 samples 25 sampling events	Ammonia mg/L	varies by pH and temperature (A&Ww chronic)	0.05 - 2.4	4 of 33 samples 2 of 11 events	Impaired	AGFD and Univ. of Arizona collected 55 samples in 1998-2002. Assessed as "impaired" due to ammonia exceedances and low dissolved oxygen.  Also placed on the Planning List due to: 1. Missing core parameters: ammonia, nitrate, nitrite, dissolved metals (cadmium, copper, and zinc). 2. Former turbidity standard exceedances. Causes and sources of turbidity will be investigated during the next monitoring cycle for this watershed.
			Dissolved oxygen mg/L	>6.0 (A&Ww)	1.0 - 19.5	16 of 55	Impaired	
			pH SU	6.5 - 9.0 (A&Ww, PBC)	6.8 - 9.9	5 of 55	Attaining	
			Turbidity (former standard) NTU	25 (A&Ww)	0.2 - 500	21 of 34	Inconclusive (see comment*)	
Parker Canyon Lake AZL15050301-1040 A&Ww, FC, PBC, Agl, Agl	ADEQ Lakes Program SCP&K-A 100035	2000 - 1 partial suite 2001 - 3 full suites	No exceedances					
	ADEQ Lakes Program SCP&K-B 100035	1998 - 2 partial suites	No exceedances					



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row  A&Wc: Inconclusive FC: Inconclusive FBC: Inconclusive Agl: Attaining Agl: Attaining	1998 - 2001  6 samples 6 sampling events	No exceedances					ADEQ collected 6 samples at 2 sites in 1998-2001. Assessed as "attaining some uses." Placed on the Planning List due to: 1. A fish consumption advisory (issued in 2002) for mercury in fish tissue, and 2. Missing core parameters: <i>Escherichia coli</i> and dissolved metals (cadmium, copper, and zinc).
Patagonia Lake AZL15050301-1050 A&Wc, FC, FBC, DWS, Agl, Agl	ADEQ Lakes Program SCPAT-A 100060	1998 - 2 partial suites 2000 - 1 partial suite 2001 - 3 partial suites	No exceedances					
	Summary Row  A&Wc: Inconclusive FC: Attaining FBC: Inconclusive DWS: Attaining Agl: Attaining Agl: Attaining	1998 - 2001  6 samples 6 sampling events	No exceedances					ADEQ collected 6 samples in 1998-2001. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> and turbidity.
Pena Blanca Lake AZL15050301-1070 A&Wc, FC, FBC, Agl, Agl	ADEQ Lakes Program SCPEN-A 100064	1998 - 2 partial suites 2000 - 1 partial suite 2001 - 3 partial suites	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl)	6.1 - 8.6	1 of 6		
			Selenium (total) µg/L	2.0 (A&Wc chronic)	<2 - 4	1 of 6		
			Turbidity (former standard) NTU	10	2 - 13	1 of 3		
	Summary Row  A&Wc: Inconclusive FC: Not attaining FBC: Inconclusive Agl: Attaining Agl: Inconclusive	1998 - 2001  6 samples 6 sampling events	pH SU	6.5 - 9.0 (A&Wc, FBC, Agl)	6.1 - 8.6	1 of 6	Inconclusive	ADEQ collected 6 samples in 1998-2001.  A TMDL for mercury in fish tissue was approved by EPA in 1999. Assessed as "not attaining" until sufficient data are collected to indicate that mercury in fish tissue is no longer a concern.
			Selenium (total) µg/L	2.0 (A&Wc chronic)	<2 - 4	1 of 6 samples 1 of 6 events	Inconclusive	Placed on the Planning List for: 1. TMDL follow-up monitoring, 2. pH exceedances, 3. Selenium exceedances, and 4. Missing core parameters: <i>Escherichia coli</i> and dissolved metals (cadmium, copper, and zinc).
			Turbidity (former standard) NTU	10 (A&Wc)	2 - 13	1 of 3	Inconclusive (see comment)	5. Former turbidity standard exceedances. Causes and sources of turbidity will be investigated during the next monitoring cycle for this watershed.



**TABLE 19. SANTA CRUZ - RIO MAGDALENA - RIO SONOYTA WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCE OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD DESIGNATED USE	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
Rose Canyon Lake AZL15050302-1260 A&Wc, FC, FBC, AgL	ADEQ Lakes Program SCROS-A 100183	1998 - 1 partial suite 2000 - 1 partial suite 2001 - 3 partial suites	pH SU	6.5 - 9.0 (A&Wc, FBC, AgL)	6.2 - 9.8	1 of 3 high 2 of 3 low		
			Turbidity (former standard) NTU	10 (A&Wc)	4 - 30	1 of 4		
	Summary Row  A&Wc Inconclusive FC Attaining FBC Inconclusive AgL Inconclusive	1998 - 2001  5 samples 5 sampling events	pH SU	6.5 - 9.0 (A&Wc, FBC, AgL)	6.2 - 9.8	3 of 3 (1 of 3 high, 2 of 3 low)	Inconclusive	ADEQ collected 5 samples in 1998-2001. Assessed as "attaining some uses" and placed on the Planning List due to: 1. pH violations. 2. Missing core parameters: <i>Escherichia coli</i> and dissolved metals (cadmium, copper, and zinc). 3. Former turbidity standard exceedances. Causes and sources of turbidity will be investigated during the next monitoring cycle for this watershed.
			Turbidity (former standard) NTU	10 (A&Wc)	4 - 30	1 of 4	Inconclusive (see comment*)	



**TABLE 20. SANTA CRUZ-RIO MAGDALENA-RIO SONOYTA WATERSHED -- ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
<b>SANTA CRUZ-RIO MAGDALENA-RIO SONOYTA WATERSHED -- STREAM ASSESSMENTS</b>				
Alum Gulch headwaters - 31 28°20'110 43°51" - 1 mile AZ15050301-561A	A&We Not attaining PBC Not attaining AgL Not attaining Category 4A -- Not attaining	On the Planning List due to: 1. <u>Missing core parameter:</u> total lead. 2. TMDL follow-up monitoring for <u>cadmium, copper, pH, and zinc.</u> (Total cadmium exceedances in 3 of 4 samples, dissolved copper exceedances in 2 of 2 sampling events, total copper exceedances in 1 of 4 samples, low pH in 4 of 4 samples, dissolved zinc exceedances in 2 of 2 sampling events, and total zinc exceedances in 3 of 4 samples.)	Delist cadmium, copper, pH, and zinc. TMDLs for these parameters were approved by EPA in 2003. Place on the Planning List for TMDL follow-up monitoring.	
Alum Gulch 31 28°20'110 43°51" - 31 29°17'110 44°25" - 1 mile AZ15050301-561B	A&Ww Not attaining FC Not attaining FBC Not attaining AgL Not attaining Category 4A -- Not attaining	On the Planning List due to: 1. <u>Missing core parameters:</u> <i>Escherichia coli</i> , total metals (lead and mercury), and turbidity/SSC. 2. TMDL follow-up monitoring for <u>cadmium, copper, pH, and zinc.</u> (Total cadmium exceedances in 4 of 6 samples, acute and chronic cadmium exceedances in 5 of 5 sampling events, acute and chronic copper exceedances in 5 of 5 sampling events, total copper exceedances in 6 of 6 samples, low pH in 6 of 6 samples, acute and chronic zinc exceedances in 5 of 5 sampling events, and total zinc exceedances in 4 of 6 samples.)	Delist cadmium, copper, pH, and zinc. TMDLs for these parameters were approved by EPA in 2003. Place on the Planning List for TMDL follow-up monitoring.	
Chimenea Creek headwaters - Rincon Creek 8 miles AZ15050302-140	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (2 samples).		
Cienega Creek headwaters - Gardner Canyon 16 miles AZ15050302-006A Unique Water	A&Ww Attaining FC Attaining FBC Inconclusive AgL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameter:</u> <i>E. coli</i> .		
Cienega Creek Gardner Canyon - USGS gage station (Pantano Wash) 11 miles AZ15050302-006B	A&Ww Attaining FC Attaining FBC Inconclusive AgL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameter:</u> <i>E. coli</i> .		
Cox Gulch headwaters - 3R Canyon 2 miles AZ15050301-560	A&Ww Not attaining FC Inconclusive FBC Not attaining Category 4A -- Not attaining	On the Planning List due to: 1. <u>Missing core parameters:</u> <i>Escherichia coli</i> , dissolved oxygen, total mercury, and turbidity/SSC. 2. TMDL follow-up monitoring for <u>cadmium, copper, pH, and zinc.</u> (Acute and chronic cadmium exceedances in 2 of 2 sampling events, acute and chronic copper exceedances in 2 of 2 sampling events, total copper exceedances in 3 of 3 samples, low pH in 1 of 1 sample, and acute and chronic zinc exceedances in 2 of 2 sampling events.)		Cadmium, copper, zinc and pH TMDLs for Three R Canyon included loadings for Cox Gulch (a tributary). These TMDLs were approved by EPA in 2003. Add to the Planning List for TMDL follow-up monitoring.
Cox Gulch, unnamed tributary of headwaters - Cox Gulch 1 mile AZ15050301-877	A&We Not attaining PBC Not attaining Category 4A -- Not attaining	On the Planning List due to: 1. Insufficient monitoring data to assess (1 sample). 2. TMDL follow-up monitoring for <u>cadmium, copper, pH, and zinc.</u> (Total and acute copper and acute zinc exceedances in 1 of 1 sampling event.)		Samples were collected on this reach in support of the Three R Canyon TMDLs. Cadmium, copper, zinc, and pH loadings from this reach were addressed in the Three R Canyon TMDLs approved by EPA in 2003. Therefore, assessed as "not attaining" and add to the Planning List for TMDL follow-up monitoring.

**TABLE 20. SANTA CRUZ-RIO MAGDALENA-RIO SONOYTA WATERSHED -- ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Harshaw Creek headwaters - Sonoita Creek 14 miles AZ15050301-025	A&We Not attaining PBC Not attaining Agl Not attaining Category 4A -- Not attaining	On the Planning List due to: 1. Missing core parameter: total lead. 2. TMDL follow-up monitoring for <u>copper and pH</u> . (Acute and chronic copper exceedance and low pH in 1 of 4 sampling events. )	Delist zinc. Designated uses were changed from A&Ww to A&We, resulting in a change in applicable standards. No exceedances of the new standard.	Copper and pH TMDLs were approved by EPA in 2003. Although copper and pH were delisted in 2002 due to requirements in the Impaired Water Identification Rule, a draft TMDL had already been completed. Place copper and pH on the Planning List for TMDL follow-up monitoring.
Harshaw Creek, <u>unnamed tributary of</u> (Endless Chain Mine tributary) headwaters - Harshaw Creek 2 miles AZ15050301-888	A&We Not attaining PBC Not attaining Category 4A -- Not attaining	On the Planning List for TMDL follow-up monitoring for <u>copper and pH</u> . (Low pH in 1 of 3 samples.)		Samples were collected on this reach in support of the Harshaw Creek TMDLs. Copper and pH loadings from this tributary were addressed in the Harshaw Creek TMDLs approved by EPA in 2003. Therefore, assessed as "not attaining" and add to the Planning List for TMDL follow-up monitoring.
Humbolt Canyon headwaters - Alum Gulch 2 miles AZ15050301-340	A&Ww Not attaining FC Inconclusive FBC Not attaining Category 4A -- Not attaining	On the Planning List due to: 1. Missing core parameters: <u>Escherichia coli</u> , total mercury, and turbidity/SSC. 2. TMDL follow-up monitoring for <u>cadmium, copper, zinc and pH</u> . (Acute and chronic cadmium, acute and chronic copper, acute and chronic zinc exceedances, and low pH in 1 of 1 sampling event.)		Samples were collected on this reach in support of the Alum Gulch TMDLs. Cadmium, copper, zinc and pH loadings from this tributary were addressed in the Alum Gulch TMDLs approved by EPA in 2003. Therefore, assessed as "not attaining" and add to the Planning List for TMDL follow-up monitoring.
Loma Verde Wash headwaters - unnamed trib to Tanque Verde Wash 4 miles AZ15050302-268	A&We Inconclusive PBC Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (2 samples).		
Madera Canyon Creek headwaters - tributary at 31° 43'42"/110° 52'50" 2 miles AZ15050301-322A	A&Wc Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (1 sample).		
Madrona Creek headwaters - Rincon Creek 7 miles AZ15050302-138	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (1 sample).		
Nogales & East Nogales Washes Mexico border - Potrero Creek 6 miles AZ15050301-011	A&Ww Impaired PBC Impaired Category 5 -- Impaired	On the Planning List due to former <u>turbidity</u> standard exceedances (5 of 18 samples). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.	On the 303(d) List (since 1996) due to <u>chlorine</u> exceedances (12 of 12 sampling events).  Add ammonia to the 303(d) List for chronic ammonia exceedances (4 of 18 sampling events).  Add copper to the 303(d) List due to chronic copper exceedances (2 of 18 sampling events).  Add <u>Escherichia coli</u> to the 303(d) List exceedances (9 of 14 sampling events).  Delist fecal coliform. Standard repealed in 2002 and replaced with the <u>Escherichia coli</u> standard.  Delist turbidity. The turbidity standard was repealed in 2002. Add to the Planning List due to exceedances of the former standard.	Bacterial contamination is due to insufficient wastewater infrastructure in Mexico. The chlorine tablets put in the stream to mitigate high bacterial contamination are toxic to aquatic life.  EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.



**TABLE 20. SANTA CRUZ-RIO MAGDALENA-RIO SONOYTA WATERSHED -- ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Pena Blanca Canyon Creek Mexico border - Pena Blanca Lake 5 miles AZ15050301-808	A&Ww Inconclusive FBC Inconclusive FC Inconclusive Category 3 – Inconclusive	On Planning List (no current monitoring data). Added in 2002 due to insufficient monitoring data.		
Potrero Creek Interstate 19 - Santa Cruz River 5 miles AZ15050301-500B	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 – Inconclusive	On the Planning List due to: 1. <u>Acute and chronic chlorine</u> exceedance (1 of 1 sampling event). 2. <u>Chronic copper</u> exceedance (1 of 2 sampling events). 3. <u>Missing core parameters</u> : dissolved metals (cadmium, copper, and zinc) and total metals (mercury, lead, and copper).	Delist fecal coliform. Arizona replaced its fecal coliform standards with <i>Escherichia coli</i> standards. Reach is meeting the <i>Escherichia coli</i> standards.	
Redrock Canyon Creek headwaters - Harshaw Creek 13 miles AZ15050301-576	A&Ww Attaining FC Attaining FBC Attaining Category 1 – Attaining All Uses			
Sabino Canyon Creek tributary at 32° 23'28" / 110° 47'00" - Tanque Verde Wash 20 miles AZ15050302-014B (Reach was split into coldwater and warmwater segments since last assessment. No current data in 014A.)	A&Wc Inconclusive FC Attaining FBC Attaining DWS Attaining AgL Attaining Category 2 – Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : dissolved metals (cadmium, copper, and zinc).		
Santa Cruz River headwaters - Mexico border 14 miles AZ15050301-268	A&Ww Attaining FC Attaining FBC Attaining AgL Attaining AgL Attaining Category 1 – Attaining All Uses			
Santa Cruz River Mexico border - Nogales WWTP 17 miles AZ15050301-010	A&Ww Attaining FC Attaining FBC Impaired DWS Attaining AgL Attaining AgL Attaining Category 5 – Impaired	<u>Remove turbidity</u> from the Planning List. Turbidity is supporting uses (2 of 22 samples exceed).	On the 303(d) List since 2002 due to <u><i>Escherichia coli</i></u> exceedances (2 of 20 sampling events).  Delist fecal coliform as the standard has been replaced by <i>Escherichia coli</i> standards.	
Santa Cruz River Nogales WWTP - Josephine Canyon 9 miles AZ15050301-009	A&Wedw Inconclusive PBC Attaining AgL Inconclusive Category 2 – Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : dissolved metals (cadmium, copper, and zinc) and total metals (copper and lead).	Delist fecal coliform as the standard has been replaced by <i>Escherichia coli</i> standards. No <i>Escherichia coli</i> exceedances occurred in 15 samples taken in 2000 - 2001.	
Santa Cruz River Josephine Canyon - Tubac Bridge 5 miles AZ15050301-008A	A&Wedw Inconclusive PBC Attaining AgL Inconclusive Category 2 - Attaining Some Uses	On the Planning List due to: 1. <u>Chlorine</u> exceedance (1 of 1 sampling event). 2. Former turbidity standard exceedances (8 of 20 samples). Monitoring will be scheduled to determine whether bottom deposit violations are occurring. 3. <u>Missing core parameters</u> : dissolved metals (cadmium, copper, and zinc) and total metals (copper and lead).	Delist fecal coliform as the standard has been replaced by <i>Escherichia coli</i> standards. No <i>Escherichia coli</i> exceedances occurred in 16 samples taken in 2000 - 2001.  Delist turbidity. The turbidity standard was repealed in 2002. Add to the Planning List due to exceedances of the former standard.	EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
Santa Cruz River Tubac Bridge - Sopori Wash 9 miles AZ15050301-008B	A&We Inconclusive PBC Attaining AgL Inconclusive Category 2 – Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : dissolved metals (cadmium, copper, and zinc) and total metals (copper and lead).	Delist fecal coliform as the standard has been replace by <i>Escherichia coli</i> standards. No <i>Escherichia coli</i> exceedances occurred in 17 samples taken in 2000 - 2001.	

**TABLE 20. SANTA CRUZ-RIO MAGDALENA-RIO SONOYTA WATERSHED -- ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Santa Cruz River Roger Rd. WWTP outfall - Rillito Creek 3 miles AZ15050301-003B	A&Wedw Inconclusive PBC Inconclusive Category 3 - Inconclusive	On the Planning List due to missing core parameters: <i>Escherichia coli</i> , pH, and dissolved metals (cadmium, copper, and zinc).		
Santa Cruz River Canada del Oro - HUC boundary 15050303 9 miles AZ15050301-001	A&Wedw Inconclusive PBC Attaining Category 2 - Attaining Some Uses	On the Planning List due to <u>acute and chronic chlorine</u> exceedance (1 of 2 sampling events).		
Santa Cruz River HUC boundary 15050303 - Baumgartner Rd. 25 miles AZ15050303-005A	A&Wedw Inconclusive PBC Inconclusive Category 3 - Inconclusive	On the Planning List due to missing core parameters: <i>Escherichia coli</i> , pH, and dissolved metals (cadmium, copper, and zinc).		
Sonoita Creek headwaters - Patagonia WWTP 14 miles AZ15050301-013A	A&We Inconclusive PBC Inconclusive Agl Inconclusive Category 3 - Inconclusive	On Planning List (no current monitoring data). Added in 2002 due to missing core parameters.		
Sonoita Creek 750 feet below WWTP - Santa Cruz River 19 miles AZ15050301-013C	A&Ww Impaired FC Attaining FBC Attaining Agl Attaining Agl Attaining Category 5 - Impaired	On the Planning List due to <u>chronic copper</u> exceedance (1 of 4 sampling events).	Add zinc to the 303(d) List due to zinc exceedances in 2 of 4 sampling events.	Reach was erroneously delisted for dissolved oxygen in 2002; however, the reach is expected to attain standards after more appropriate designated uses are assigned in rule. Reach is "not attaining" for dissolved oxygen.
Sycamore Canyon Creek headwaters - Mexico border 10 miles AZ15080200-002	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Category 3 - Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Three R Canyon headwaters - 31 28°35'N/110 46°19' 1 mile AZ15050301-558A (This stream has been resegmented since the last assessment)	A&We Not attaining PBC Not attaining Agl Not attaining Category 4A - Not attaining	On the Planning List due to: 1. Insufficient monitoring events to assess (only 2 sampling events). 2. TMDL follow-up monitoring for <u>cadmium, copper, zinc, and pH</u> . (Acute and chronic copper exceedance in 1 of 1 sampling event and low pH in 1 of 1 sample).	Delist <u>cadmium, copper, zinc, and pH</u> . TMDLs for these parameters were approved by EPA in 2003. Placed on the Planning List for TMDL follow-up monitoring.	
Three R Canyon 31 28°35'N/110 46°19'- 31 28°27'N/110 47°12' 1 mile AZ15050301-558B (This stream has been resegmented since the last assessment)	A&Ww Not attaining FC Inconclusive FBC Not attaining Agl Not attaining Category 4A - Not attaining	On the Planning List due to: 1. Missing core parameters: <i>Escherichia coli</i> , total metals (lead and mercury), and turbidity/SSC. 2. TMDL follow-up monitoring for <u>cadmium, copper, zinc, and pH</u> . (Cadmium, copper, and zinc exceedances in 5 of 5 sampling events each and low pH in 5 of 5 samples.)	Delist <u>cadmium, copper, zinc, and pH</u> . TMDLs for these parameters were approved by EPA in 2003. Placed on the Planning List for TMDL follow-up monitoring.	
Three R Canyon 31 28°27'N/110 47°12' - Sonoita Creek 3 miles AZ15050301-558C (This stream has been resegmented since the last assessment)	A&We Not attaining PBC Not attaining Agl Not attaining Category 4A - Not attaining	On the Planning List due to: 1. Missing core parameter: <i>Escherichia coli</i> , total lead, total mercury, and turbidity/SSC. 2. TMDL follow-up monitoring for <u>cadmium, copper, zinc, and pH</u> . (Copper exceedances in 2 of 2 sampling events, zinc exceedances in 1 of 2 sampling events and low pH in 2 of 2 samples.)	Delist <u>cadmium, copper, zinc, and pH</u> . TMDLs for these parameters were approved by EPA in 2003. Placed on the Planning List for TMDL follow up monitoring.	



**TABLE 20. SANTA CRUZ-RIO MAGDALENA-RIO SONOYTA WATERSHED -- ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Three R Canyon, unnamed tributary of headwaters - Three R Canyon 2 miles AZL15050301-889	A&We Not attaining PBC Not attaining Category 4A -- Not attaining	On the Planning List due to: 1. TMDL follow-up monitoring for <u>cadmium, copper, zinc, and pH</u> . (Copper exceedance in 1 of 1 sampling event and low pH in 1 of 1 sample.) 2. Insufficient monitoring data.		Samples were collected on this reach in support of the Three R Canyon TMDLs. <u>Cadmium, copper, zinc, and pH</u> loadings from this tributary were addressed in the Three R Canyon TMDLs approved by EPA in 2003. Therefore, assessed as "not attaining" and add to the Planning List for TMDL follow-up monitoring.
<b>SANTA CRUZ-RIO MAGDALENA-RIO SONOYTA WATERSHED -- LAKE ASSESSMENTS</b>				
Arivaca Lake 118 acres AZL15050304-0080	A&Ww Inconclusive FC Not attaining FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 4A -- Not Attaining Trophic status -- Hypereutrophic	On the Planning List due to: 1. <u>Dissolved oxygen</u> exceedance (1 of 7 samples). 2. <u>pH</u> exceedance (1 of 7 samples). 3. <u>Selenium</u> exceedance (1 of 7 sampling events). 4. <u>Fish kill</u> in 1999 related to algal blooms, which may be evidence of a narrative standard violation. 5. <u>Missing core parameters: Escherichia coli</u> and dissolved metals (cadmium, copper, and zinc). 6. TMDL follow-up monitoring for <u>mercury concentration</u> in fish tissue.		TMDL for mercury in fish tissue was approved by EPA in 1999. Added to the Planning List in 2002 for TMDL follow-up monitoring.
Kennedy Lake 10 acres AZL15050301-0720	A&Ww Inconclusive FC Attaining PBC Inconclusive Category 2 -- Attaining Some Uses Trophic status -- Eutrophic	On the Planning List due to <u>missing core parameters: Escherichia coli</u> and dissolved metals (cadmium, copper, and zinc).		
Lakeside Lake 15 acres AZL15050302-0760	A&Ww Impaired FC Attaining PBC Inconclusive Category 5 -- Impaired Trophic status -- Hypereutrophic	On the Planning List due to: 1. Former <u>turbidity</u> standard exceedances (21 of 34 samples). Investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed. 2. <u>Missing core parameters: Escherichia coli</u> and dissolved metals (cadmium, copper, and zinc).	<u>Add ammonia</u> to the 303(d) List due to chronic ammonia exceedances (2 of 11 sampling events).  <u>Add dissolved oxygen</u> to the 303(d) List (low dissolved oxygen in 16 of 55 samples).	City installed an aeration system in the lake in June 2002, but exceedances are still occurring.  A draft nutrient TMDL, providing for dissolved oxygen and pH, was completed in 2002, but has <u>not</u> been approved by EPA.  EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
Parker Canyon Lake 129 acres AZL15050301-1040	A&Wc Inconclusive FC Inconclusive FBC Inconclusive Agl Attaining Agl Attaining Category 2 -- Attaining Some Uses Trophic status -- Mesotrophic	On the Planning List due to: 1. <u>Missing core parameters: Escherichia coli</u> and dissolved metals (cadmium, copper, and zinc). 2. <u>Fish consumption advisory</u> for mercury issued in 2002 may be evidence of a narrative toxic standards violation.		For the 2002 303(d) List, EPA placed waters with a <u>fish consumption advisory</u> on the 303(d) List, as the advisory was considered adequate evidence of a narrative toxic standards violation. The advisory for Parker Lake was issued after the last 303(d) List. ADEQ anticipates that EPA will take the same action and place this water on the 2004 303(d) List.
Patagonia Lake 230 acres AZL15050301-1050	A&Wc Inconclusive FC Attaining FBC Inconclusive DWS Attaining Agl Attaining Agl Attaining Category 2 -- Attaining Some Uses Trophic status -- Eutrophic	On the planning List due to <u>missing core parameters: Escherichia coli</u> and turbidity.  <u>Remove dissolved oxygen</u> from the Planning List. No exceedances in 8 samples indicates support of designated uses.		

**TABLE 20. SANTA CRUZ-RIO MAGDALENA-RIO SONOYTA WATERSHED -- ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Pena Blanca Lake 51 acres AZL15050301-1070	A&Wc Inconclusive FC Not attaining FBC Inconclusive Agl Attaining Agl Inconclusive Category 4A — Not attaining Trophic status -- Eutrophic	On the Planning List due to: 1. <u>Low pH</u> (1 of 6 samples). 2. <u>Chronic selenium exceedance</u> (1 of 6 sampling events). 3. Former <u>turbidity</u> standard exceedance (1 of 3 samples). Causes and sources of turbidity will be investigated during the next monitoring cycle for this watershed. 4. <u>Missing core parameters: Escherichia coli</u> and dissolved metals (cadmium, copper, and zinc). 5. TMDL follow-up monitoring for <u>mercury concentration in fish tissue</u> .		TMDL for mercury in fish tissue was approved by EPA in 1999. Added to the Planning List in 2002 for TMDL follow-up monitoring.
Rose Canyon Lake 7 acres AZL15050302-1260	A&Wc Inconclusive FC Attaining FBC Inconclusive Agl Inconclusive Category 2 — Attaining Some Uses Trophic status — Eutrophic	On the Planning List due to: 1. <u>Low pH</u> (2 of 3 samples) and <u>high pH</u> (1 of 3 samples). 2. Former <u>turbidity</u> standard exceedance (1 of 4 samples). Causes and sources of turbidity will be investigated during the next monitoring cycle for this watershed. 3. <u>Missing core parameters: Escherichia coli</u> and dissolved metals (cadmium, copper, zinc).		ADEQ anticipates that EPA will use the same criteria and place this lake on the 2004 303(d) List for pH (3 of 3 samples did not meet standards). For the 2002 303(d) List, EPA determined that 3 or more exceedances with less than 10 samples were sufficient to list a water as "impaired," although Arizona's Impaired Water Identification Rule would require a minimum of 5 exceedances in 20 samples.





*Bonita Creek, upstream of the Gila River northeast of Safford, Arizona.*

## The Upper Gila Watershed

The Upper Gila watershed in Arizona is defined by the Gila River drainage area, from the location where the river enters from New Mexico, to Coolidge Dam (San Carlos Reservoir). Perennial flow is limited to the Gila River above Safford, the San Francisco River and its tributaries, Eagle Creek, portions of Bonita Creek, the San Carlos River, and short segments of tributaries on Mount Graham and the Chiricahua Mountains.

This 7,354 square mile watershed is occupied by only 51,500 people (2000 census), mostly living in the Safford and Clifton areas. Land ownership is approximately: 10% private land, 15% state land, 47% federal land, and 28% Tribal lands. In the Safford area, irrigated agriculture uses a high percentage of the Gila River flow. Outside of this area, land use is primarily open range grazing and recreation, with a minor amount of forestry in the national forests. A major mining facility is located in the Clifton-Morenci area along the San Francisco River. Along with the Gila Box Riparian National Conservation Area established in 1990, five wilderness areas and a wilderness study area are located in this watershed and have restricted land uses.

Elevations range from 10,028 feet (above sea level) on Mount Graham to 2,990 feet at Coolidge Dam. Except for a few sky islands (mountains located in the desert), most of the watershed is below 5,000 feet, with low desert flora and fauna and warmwater aquatic communities where perennial waters exist.

**The assessment** – Assessments were completed for 26 stream reaches and four lakes in this watershed. Of the 310 stream miles assessed, 70 miles were attaining all uses (four reaches) and 29 miles (3 reaches) were assessed as impaired or not attaining a use. Of the 168 lake acres assessed, none were assessed as attaining all uses and 120 acres (one lake) were assessed as impaired or not attaining a use. All others were inconclusive or attaining some uses.

A watershed assessment map follows on the next page, illustrating stream and lake assessments by category. The Upper Gila **monitoring table (Table 21)** following the map summarizes the water quality data used in the assessment. It is followed by the **assessment table (Table 22)**, which bridges current assessments with past assessments and impaired water identification. Important to note in this table are comments regarding previous 303(d) lists (what has been added and removed), category designations (1 through 5), references to potential actions by EPA, and status of TMDLs.

Detailed information on how to use these tables is found at the beginning of this chapter (p. IV-1). Assessment methods and criteria can be found in Chapter III.



# Upper Gila Watershed Assessment for Streams & Lakes

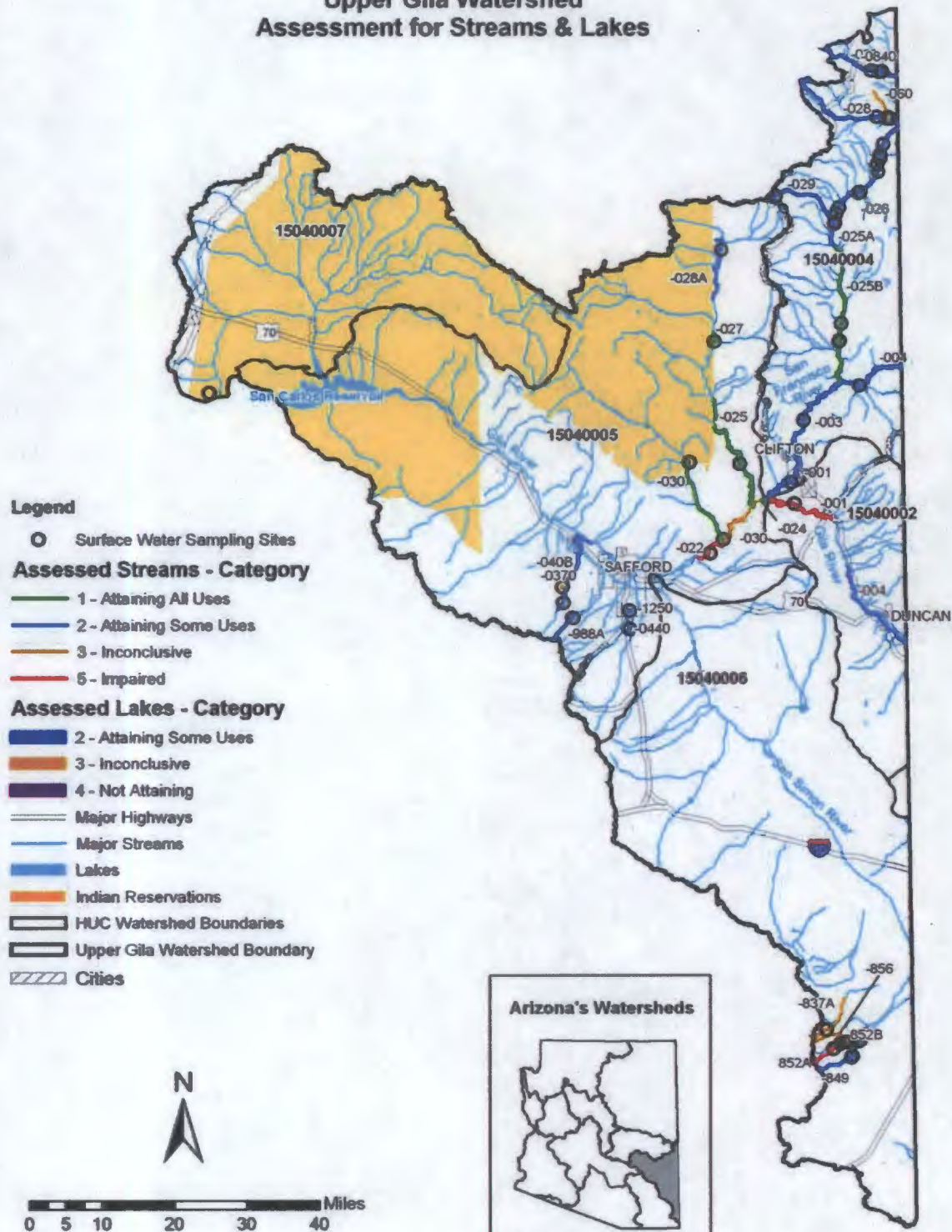


Figure 23. Watershed monitoring and assessments



**TABLE 21. UPPER GILA WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEARS SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
STREAM MONITORING DATA								
Ash Creek Unnamed tributary at 32°45'37"/ 109°52'22" - Gila River AZ15040005-040B A&Ww, FC, FBC, AgL	ADEQ Ambient Monitoring At Forest Road #307 UGA1H008.62 100830	1999 - 1 full suite 2000 - 2 partial suites 2002 - 2 full suites	No exceedances					Lab reporting limits for the dissolved metals (cadmium, copper, and zinc) were too high to use results for assessment.
	Summary Row  A&Ww Inconclusive FC Attaining FBC Attaining AgL Attaining	1999 - 2002  5 sampling events	No exceedances					ADEQ collected 5 samples in 1999 - 2002. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: dissolved metals (cadmium, copper, and zinc).
Blue River New Mexico border - KP Creek AZ15040004-026 A&Wc, FC, FBC, AgL, AgL	ADEQ TMDL Program Bobcat Flat (Site 5) UGBLR043.03 101184	2001 - 4 field	No exceedances					
	ADEQ TMDL Program Lazy YJ Ranch (Site 6) UGBLR042.69 101185	2001 - 4 field	Turbidity NTU	10 (A&Wc)	<1 - 13	1 of 4		
	ADEQ TMDL Program Below Nolan Creek (Site 7) UGBLR041.93 101186	2001 - 4 field	No exceedances					
	ADEQ TMDL Program Above Blue Crossing (Site 8) UGBLR039.84 101187	2001 - 4 field	No exceedances					
	ADEQ TMDL Program Below Blue Crossing (Site 9) UGBLR039.67 101188	2001 - 4 field	No exceedances					
	ADEQ TMDL Program Above Balke Crossing (Site 10) UGBLR035.10 101189	2001 - 4 field	No exceedances					
	ADEQ TMDL Program Below Balke Crossing (Site 11) UGBLR034.75 101190	2001 - 4 field	No exceedances					
	ADEQ Biocriteria & Ambient Monitoring Below Jackson Box (upper) UGBLR033.04 100419	1999 - 1 partial suite 2000 - 3 partial suites	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.0 - 7.2 (84 - 96%)	2 of 4		
	ADEQ TMDL Program Above Box (Site 12) UGBLR030.42 101191	2001 - 4 field	No exceedances					

**TABLE 21. UPPER GILA WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEARS SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	
	ADEQ TMDL Program Below Box (Site 13) UGBLR029.50 101192	2001 - 4 field	No exceedances					
	Summary Row	1999-2001 40 samples 8 sampling events	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.0 - 7.5 (84 - 102%)	2 of 22	Attaining	ADEQ collected 40 samples in 1999-2001, primarily in support of a turbidity investigation. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, manganese, copper, and lead).
	A&Wc Inconclusive FC Inconclusive FBC Attaining Agl Inconclusive Agl Inconclusive		Turbidity (former standard) NTU	10 (A&Wc)	<1 - 13	1 of 40	Attaining	
Blue River KP Creek - Strayhorse Creek AZ15040004-025A A&Wc, FC, FBC, Agl, Agl	ADEQ Ambient Monitoring Below KP Creek UGBLR021.95 100835	1999 - 1 partial suite 2000 - 3 partial suites	No exceedances					
	Summary Row A&Wc Inconclusive FC Inconclusive FBC Attaining Agl Inconclusive Agl Inconclusive	1999 - 2000 4 sampling events	No exceedances					ADEQ collected 4 samples in 1999 - 2000. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, manganese, copper, and lead).
Blue River Strayhorse Creek - San Francisco River AZ15040004-025B A&Ww, FC, FBC, Agl, Agl	ADEQ TMDL Program Above Fritz Ranch UGBLR008.07 100420	2001 - 3 field	No exceedances					
	ADEQ Fixed Station At Juan Miller Road UGBLR005.88 100398	1998 - 1 full suites 1999 - 5 full suites 2000 - 4 full suites 2001 - 4 full suites	No exceedances					
	ADEQ TMDL Program Near Clifton UGBLR005.59 100770	2001 - 4 field	No exceedances					
	Summary Row A&Ww Attaining FC Attaining FBC Attaining Agl Attaining Agl Attaining	1998-2002 25 samples 20 sampling events	No exceedances					ADEQ collected 25 samples at 3 sites from 1998-2002. Assessed as "attaining all uses."
Bonita Creek Park Creek - Gila River AZ15040005-030 A&Ww, FC, FBC, DWS, Agl Unique Water	ADEQ Ambient Monitoring Below Indian Reservation boundary UGBON011.31 100188	1999 - 1 full suite 2000 - 1 full + 2 partial suites	No exceedances					



**TABLE 21. UPPER GILA WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEARS SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	ADEQ Ambient Monitoring Above Gila River UGBON000.20 100185	1999 - 1 partial suite 2000 - 1 full + 3 partial suites 2001 - 1 full + 1 partial suite 2002 - 1 full suite	Turbidity (former standard) NTU	15 (Unique Water) (A&Ww)	<1 - 49	1 of 8		
	Summary Row A&Ww    Attaining FC        Attaining FBC       Attaining DWS       Attaining Agl       Attaining	1998-2002 12 samples 11 sampling events	Turbidity (former standard) NTU	15 (Unique Water) (A&Ww)	<1 - 49	1 of 11	Attaining	ADEQ collected 12 samples at 2 sites in 1998-2002. Assessed as "attaining all uses."
Campbell Blue Creek headwaters - Blue River AZ15040004-028 A&Wc, FC, FBC, AgL	ADEQ TMDL Program Above Turkey Creek (site 2) UGCMB002.30 101181	2001 - 4 field	No exceedances					Lab reporting limits for some dissolved copper samples were too high to use results for assessment.
	ADEQ Ambient Monitoring Above K E Canyon UGCMB002.16 100522	1999 - 1 full suite 2000 - 2 full + 1 partial suites	No exceedances					
	ADEQ TMDL Program Below Turkey Creek (site 3) UGCMB001.46 101182	2001 - 4 field	No exceedances					
	ADEQ TMDL Program Above Dry Blue (site 4) UGCMB000.18 101183	2001 - 4 field	No exceedances					
	Summary Row A&Wc    Inconclusive FC        Attaining FBC       Attaining Agl       Attaining	1999-2001 16 samples 8 sampling events	No exceedances					ADEQ collected 16 samples at 4 sites from 1999-2001. Assessed as "attaining some uses" and added to the Planning List due to missing cors parameter: dissolved copper.
Cave Creek headwaters - South Fork of Cave Creek AZ15040006-852A A&Wc, FC, FBC, AgL, AgL Unique Water	ADEQ Unique Waters Program Above Herb Martyr Campground UGCAV009.86 101108	1998 - 2 partial suites 1999 - 1 partial suite 2001 - 1 full suite 2002 - 1 full suite	No exceedances					
	ADEQ Unique Waters Program Above summer homes along FS Road 42A UGCAV008.92 101107	1998 - 1 partial suite 1999 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	8.4 - 8.1 (81 - 92%)	1 of 2		Low dissolved oxygen due to naturally occurring ground water upwelling, and not anthropogenic causes. Not included in the final assessment.
	ADEQ Unique Waters Program Above SW Research Station UGCAV008.49 101106	1998 - 2 partial suites	No exceedances					

**TABLE 21. UPPER GILA WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEARS SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	ADEQ Unique Waters Program Above South Fork of Cave Creek UGCAV007.70 101105	1998 - 2 partial suites	No exceedances					
	ADEQ Unique Waters Program Below North Fork Cave Creek UGCAV007.64 100933	1998 - 1 partial suite 1999 - 1 full + 1 partial suite 2000 - 3 full + 1 partial suite 2001 - 1 full + 1 partial suite 2002 - 1 full suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.2 - 9.3 (78 - 107%)	1 of 10		Stream is dominated by thermal spring at low flows (and high total dissolved solids). Dissolved oxygen is naturally below surface water standards in such spring recharge areas. Therefore, low dissolved oxygen not included in final assessment.  Lab reporting limits for 8 other six selenium samples were too high to use results for assessment.
			Selenium (total) µg/L	2 (A&Wc chronic)	<5 - 8.8	2 of 2		
			Turbidity (former standard) NTU	10 (A&Wc)	<1-15	1 of 10		
	Summary Row A&Wc Impaired FC Attaining FBC Attaining Agl Attaining Agl Attaining	1998-2002  21 samples 10 sampling events	Selenium (total) µg/L	2 (A&Wc chronic)	<5 - 8.8	2 of 2 events	Impaired	ADEQ collected 21 samples at 5 sites in 1998-2002. Assessed as "impaired" due to selenium exceedances.
			Turbidity (former standard) NTU	10 (A&Wc)	<1 - 15	1 of 10	Attaining	
Cave Creek South Fork of Cave Creek - USFS boundary AZ15040006-852B A&Ww, FC, FBC, Agl, Agl Unique Water	ADEQ Unique Waters Program Below South Fork of Cave Creek UGCAV007.48 101104	1998 - 2 partial suites	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	257	1 of 1		Exceedance occurred during very high flow (normally <1 cfs, flow at 85 cfs).
	ADEQ Unique Waters Program Below Coronado Ranger Station UGCAV006.55 100937	1998 - 2 partial suites 1999 - 1 full suite 2000 - 1 full + 2 partial suites 2001 - 2 full suites	Turbidity (former standard) NTU	50 (A&Ww)	<1-64	1 of 8		Exceedance occurred during very high flow (normally <1 cfs, flow at 85 cfs).
	Summary Row A&Ww Inconclusive FC Attaining FBC Attaining Agl Attaining Agl Attaining	1998-2001  10 samples 8 sampling events	<i>Escherichia coli</i> CFU / 100 ml	235 (FBC)	257	1 of 8 events (None in the last 3 years of sampling)	Attaining	ADEQ collected 10 samples at 2 sites in 1998-2001. Assessed as "attaining some uses" and placed on the Planning List due to exceedance of the former turbidity standard. Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.
			Turbidity (former standard)	50 (A&Ww)	< 1 - 64	1 of 8	Inconclusive (see comment)	
			NTU					
Cave Creek, North Fork headwaters - Cave Creek AZ15040008-856 A&Wc, FC, FBC (tributary rule)	ADEQ Unique Waters Program Above Cave Creek UGNCV000.03 101129	1999 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	5.3 (73%)	1 of 1		Low dissolved oxygen due to naturally occurring ground water upwelling at thermal spring, and not anthropogenic causes. Not included in the final assessment.
	Summary Row A&Wc Inconclusive FC Inconclusive FBC Inconclusive	1999  1 sampling event	No exceedances					Insufficient monitoring data to assess.



TABLE 21. UPPER GILA WATERSHED – 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEARS SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	
Cave Creek, <u>South Fork</u> headwaters - Cave Creek AZ15040006-849 A&Wc, FC, FBC, Agl, AgL Unique Water	ADEQ Biocriteria Program Above South Fork Campground UGSCV002.45 100840	1998 - 1 partial suite	No exceedances					
	ADEQ Ambient Monitoring Above South Fork Campground UGSCV002.26 100639	1998 - 1 full + 1 partial suite 1999 - 2 full suites 2000 - 2 full + 2 partial suites 2001 - 2 full suites	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	3.6 - 8.8 (40 - 98%)	5 of 10		Low dissolved oxygen due to naturally occurring ground water upwelling, and not anthropogenic causes. Not included in the final assessment.
			<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	<2 - 240	1 of 9		Exceedances coincided with very high flow (normally < 1 cfs, flow at 22 cfs). Pristine watershed.
			Turbidity (former standard) NTU	10 (A&Wc)	<1 - 36	1 of 10		
	ADEQ Unique Waters Program Above confluence with Cave Creek UGSCV000.12 101109	1998 - 1 full + 1 partial suite	No exceedances					
	Summary Row		<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	<2 - 240	1 of 10 events (in 2000)	Inconclusive	ADEQ collected 13 samples at 3 sites in 1999 - 2001. Assessed as "attaining some uses" and placed on the Planning List due to <i>Escherichia coli</i> exceedance.
	A&Wc    Attaining FC        Attaining FBC       Inconclusive Agl       Attaining Agl       Attaining	1998 - 2001 13 samples 10 sampling events	Turbidity (former standard) NTU	10	< 1 - 36	1 of 13	Attaining	
Eagle Creek headwaters - unnamed tributary at 33°23'24" / 109°29'35" AZ15040005-028A A&Wc, FC, FBC, DWS, Agl, AgL	ADEQ Ambient Monitoring Above Honeymoon Campground UGEAG035.99 100535	1999 - 1 full suite 2000 - 1 full + 2 partial suites	No exceedances					
	Summary Row	1999-2000 4 sampling events	No exceedances					ADEQ collected 4 samples in 1999-2000. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, arsenic, chromium, lead, manganese, and copper).
Eagle Creek Willow Creek - Sheep Wash AZ15040005-027 A&Ww, FC, FBC, DWS, Agl, AgL	ADEQ Ambient Monitoring Above Sheep Wash Crossing UGEAG023.34 100536	1999 - 1 full suite 2000 - 1 full + 2 partial suites 2002 - 1 full suite	No exceedances					
	Summary Row	1999 - 2002 5 sampling events	No exceedances					ADEQ collected 5 samples in 1999-2002. Assessed as "attaining all uses."



**TABLE 21. UPPER GILA WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEARS SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	
Eagle Creek Sheep Wash - Gila River AZ15040005-025 A&Ww, FC, FBC, DWS, AgL, AgL	ADEQ Ambient Monitoring Below Gold Gulch @ Morenci UGEAG006.05 100806	1999 - 1 full suite 2000 - 1 full + 2 partial suites 2002 - 1 full suite	No exceedances					
	Summary Row A&Ww Attaining FC Attaining FBC Attaining DWS Attaining AgL Attaining AgL Attaining	1999 - 2002  5 sampling events	No exceedances					ADEQ collected 5 samples in 1999-2002. Assessed as "attaining all uses."
East Turkey Creek headwaters - tributary at 31°58'22" / 109°12'17" AZ15040006-837A A&Wc, FC, FBC, AgL	ADEQ Biocriteria Program Above Forest Road 42 UGETK007.70 100545	1998 - 1 partial suite	No exceedances					
	Summary Row A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1998  1 sampling event	No exceedances					Insufficient monitoring data to assess.
Frye Canyon Creek headwaters - Frye Mesa Reservoir AZ15040005-988A A&Wc, FC, FBC, DWS, AgL	ADEQ Ambient Monitoring First crossing of Trail #36 UGFRY007.00 100720	1999 - 1 full suite 2000 - 2 partial suites	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.74 - 7.78 (78-88%)	1 of 3		Low dissolved oxygen due to naturally occurring ground water upwelling, and not anthropogenic causes. Not included in the final assessment.
	Summary Row A&Wc Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive AgL Inconclusive	1999 - 2000  3 sampling events	No exceedances					ADEQ collected 3 samples in 1999-2000. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: dissolved metals (copper, cadmium, and zinc) and total metals (mercury, arsenic, chromium, lead, and copper).
Gila River NM border - Bitter Creek AZ15040002-004 A&Ww, FC, FBC, AgL, AgL	ADEQ Ambient Monitoring Duncan at New Mexico border UGGLR205.35 100808	1999 - 1 full suite 2000 - 1 full suite 2002 - 2 full suites	Selenium (total) µg/L	2 (A&Ww chronic)	<5 - 5.8	1 of 1		Lab reporting limits for 4 additional samples were too high to use results for assessment.
	Summary Row A&Ww Inconclusive FC Attaining FBC Attaining AgL Attaining AgL Attaining	1999 - 2002  4 sampling events	Selenium (total) µg/L	2 (A&Ww chronic)	<5 - 5.8	1 of 1 event	Inconclusive	ADEQ collected 4 samples in 1999 - 2002. Assessed as "attaining some uses" and placed on the Planning List due to selenium exceedance.
Gila River Scully Creek - San Francisco River AZ15040002-001 A&Ww, FC, FBC, AgL, AgL	ADEQ Ambient Monitoring Above Old Safford Bridge UGGLR197.26 100809	1999 - 1 full suite 2000 - 1 full + 2 partial suites 2001 - 1 full suite 2002 - 5 full suites	Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	5.6 - 10.1 (81-130%)	1 of 9		Exceedance occurred during higher flow event.
			Lead (total) µg/L	15 (FBC)	<5 - 110	1 of 8		Exceedance occurred during higher flow event.
			Selenium (total) µg/L	2 (A&Ww chronic)	<5 - 7	3 of 3		Reporting limits of 7 other selenium samples were too high to use results for assessment.



TABLE 21. UPPER GILA WATERSHED – 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEARS SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row A&Ww Impaired FC Attaining FBC Inconclusive Agl Attaining AgL Attaining	1999 - 2002 10 sampling events	Turbidity (former standard) NTU	50 (A&Ww)	3 - > 999	2 of 10		Both exceedances coincide with higher flow events. (Note that 4 SSC samples in 2002 did not exceed standards.)
			Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	5.61 - 10.1 (81-130%)	1 of 9	Inconclusive	ADEQ collected 10 samples 1998-2002. Assessed as "impaired" due to chronic selenium exceedances.
			Lead (total) µg/L	15 (FBC)	<5 - 110	1 of 8	Inconclusive	Placed on the Planning List due to lead exceedance and low dissolved oxygen.
			Selenium (total) µg/L	2 (A&Ww chronic)	<5 - 7	3 of 3 events	Impaired	
			Turbidity (former standard) NTU	50 (A&Ww)	3 - > 999	2 of 10	Attaining	
Gila River Bonita Creek - Yuma Wash AZ15040005-022 A&Ww, FC, FBC, Agl, AgL	USGS Fixed Station #09448500 Solomon above Safford Valley UGGLR188.98 100729	1998 - 6 full suites 1999 - 6 full suites 2000 - 4 full suites 2001 - 4 full suites 2002 - 4 full suites	Copper (dissolved) µg/L	varies by hardness (A&Ww chronic)	<2 - 9	1 of 23		Exceedance occurred during higher flow event.
			<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	<1 - 2300	3 of 23		
			Lead (total) µg/L	15 (FBC)	1 - 94	4 of 21		All exceedances coincide with higher flow events.
			Suspended sediment concentration (SSC) mg/L	80 (geometric mean) (A&Ww)	8 - 6410	Geo. means: 1998 = 174 1999 = 31 2001 = 46		Maximum base flow was calculated to be 729 cfs based on 30 years of flow data. Insufficient SSC data to calculate a geometric mean in 2000 or 2002.
			Turbidity (former standard) NTU	50 (A&Ww)	<1-10,000	7 of 24		Four of the exceedances coincide with higher flow events.
	Summary Row A&Ww Inconclusive FC Attaining FBC Impaired Agl Attaining AgL Attaining	1998-2002 24 sampling events	Copper (dissolved) µg/L	varies by hardness (A&Ww chronic)	<2 - 9	1 of 23 events	Inconclusive	USGS collected 24 samples in 1998 - 2002. Assessed as "impaired" due to <i>Escherichia coli</i> exceedances.
			<i>Escherichia coli</i> CFU	235 (FBC)	<1 - 2300	3 of 23 events (in 1998 and 2000)	Impaired	Also placed on the Planning list due to:
			Lead (total) µg/L	15 (FBC)	1 - 94	4 of 21	Inconclusive	1. Copper exceedances,
			Suspended sediment conc. (SSC) mg/L	80 (geometric mean) (A&Ww)	8 - 6410	1 of 3 annual geo. means	Inconclusive	2. Lead exceedances,
			Turbidity (former standard) NTU	50 (A&Ww)	1 - 10,000	7 of 24	Inconclusive (see comment*)	3. SSC geometric mean exceedance,
K P Creek headwaters - Blue River AZ15040004-029 A&Ww, FC, FBC, AgL	ADEQ Ambient Monitoring Below K P Cienega UG0KP065.54 100888	1999 - 1 partial suite	No exceedances					(Sampled on same date as other site).



**TABLE 21. UPPER GILA WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEARS SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	
	ADEQ Ambient Monitoring @ Blue River UGOKP000.08 100889	1999 - 1 partial suite 2000 - 3 partial suites 2002 - 1 full suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.2 - 8.9 (65 - 94%)	2 of 5		Low dissolved oxygen due to naturally occurring ground water upwelling, and not anthropogenic causes. Not included in the final assessment.
	Summary Row	1999 - 2002 6 samples 5 sampling events	No exceedances					ADEQ collected 6 samples at 2 sites in 1999-2002. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: dissolved metals (copper, cadmium, and zinc) and total metals (mercury, lead, and copper).
	A&Wc Inconclusive FC Inconclusive FBC Attaining Agl Inconclusive							
San Francisco River headwaters - New Mexico border AZ15040004-023 A&Wc, FC, FBC, Agl, AgL	ADEQ Fixed Station Above Luna Lake UGSFR059.98 100381	1999 - 3 full suites 2000 - 2 full suites 2001 - 3 full suites 2002 - 2 full suites	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	5.8 - 9.5 (72 - 100%)	1 of 10		
			Turbidity (former standard) NTU	10 (A&Wc)	6 - 26	6 of 9		Two exceedances coincide with spring runoff flows.
	Summary Row	1999 - 2002 10 sampling events	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	5.8 - 9.5 (72 - 100%)	1 of 10	Attaining	ADEQ collected 10 samples in 1999-2002. Assessed as "attaining some uses" and placed on the Planning List due to exceedances of the former turbidity standard. Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.
	A&Wc Inconclusive FC Attaining FBC Attaining Agl Attaining Agl Attaining		Turbidity (former standard) NTU	10 (A&Wc)	6 - 26	6 of 9	Inconclusive (see comment)	
San Francisco River New Mexico border - Blue River AZ15040004-004 A&Ww, FC, FBC, Agl, AgL	ADEQ Ambient Monitoring Near Martinez Ranch UGSFR017.66 100834	1999 - 1 partial suite 2000 - 1 full + 2 partial suites 2002 - 2 full suites	Turbidity (former standard) NTU	50 (A&Ww)	7 - 74	1 of 6		
			Turbidity (former standard) NTU	50 (A&Ww)	7 - 74	1 of 6	Inconclusive (see comment)	ADEQ collected 6 samples in 1999 - 2002. Assessed as "attaining some uses" and placed on the Planning List due to exceedance of the former turbidity standard. Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.
	Summary Row	1999 - 2002 6 sampling events	Turbidity (former standard) NTU	50 (A&Ww)	7 - 74	1 of 6	Inconclusive (see comment)	
	A&Ww Inconclusive FC Attaining FBC Attaining Agl Attaining Agl Attaining							
San Francisco River Blue River - Limestone Gulch AZ15040004-003 A&Ww, FC, FBC, Agl, AgL	ADEQ Fixed Station 6 miles above Clifton (below mining) UGSFR011.29 100708	1999 - 2 full + 2 partial suites 2000 - 3 full + 1 partial suite 2001 - 4 full suites 2002 - 5 full suites	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	<2 - 500	1 of 13		Exceedance occurred during summer monsoon event.
			Mercury µg/L	0.6 (FC)	<0.5 - 0.75	1 of 17		Note that the exceedance occurred in one of two split samples. The other split result was less than the lab reporting limit.
			Turbidity (former standard) NTU	50 (A&Ww)	1 - >999	3 of 16		Exceedances occurred during summer monsoon event.



**TABLE 21. UPPER GILA WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEARS SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row	1998-2002 17 sampling events	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	<2 - 500	1 of 13 events (in 2002)	Inconclusive	ADEQ collected 17 samples in 1998-2002. Assessed as "attaining some uses" and placed on the Planning List due to <i>Escherichia coli</i> exceedance.
	A&Ww FC FBC Agl Agl	Attaining Attaining Inconclusive Attaining Attaining	Mercury µg/L	0.6 (FC)	<0.5 - 0.75	1 of 17	Attaining	
			Turbidity (former standard) NTU	50 (A&Ww)	1 - > 999	3 of 16	Attaining	
San Francisco River Limestone Gulch - Gila River AZ15040004-001 A&Ww, FC, FBC, Agl, Agl	ADEQ Fixed Station Below Clifton (below mining) UGSFR003.04 100382	1998 - 3 full + 1 partial suites 1999 - 3 full + 2 partial suites 2000 - 3 full + 1 partial suites 2001 - 4 full suites 2002 - 4 full + 1 partial suites	Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	<10 - 170	1 of 22		
				varies by hardness (A&Ww chronic)	<10 - 170	1 of 22		
			Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	5.2 - 10.3 (82 - 113%)	2 of 21		
			<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	<2 - 545	1 of 17		Exceedance occurred during summer monsoon event.
			Lead (total) µg/L	15 (FBC)	<5 - 35	1 of 22		Exceedance occurred during summer monsoon event.
			Turbidity (former standard) NTU	50 (A&Ww)	<1 - > 999	4 of 21		Two samples were related to high flow events.
	Summary Row	1998 - 2002 22 sampling events	Copper (dissolved) µg/L	varies by hardness (A&Ww acute)	<10 - 170	1 of 22 events (in 2000)	Inconclusive	ADEQ collected 22 samples in 1998 - 2002. Assessed as "attaining some uses" and placed on the Planning list due to: 1. Copper exceedances, 2. <i>Escherichia coli</i> exceedances, 3. Former turbidity standard exceedances (which was on the 2002 303(d) List due to turbidity). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.
	A&Ww FC FBC Agl Agl	Inconclusive Attaining Inconclusive Attaining Attaining		varies by hardness (A&Ww chronic)	<10 - 170	1 of 22	Inconclusive	
			Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	5.2 - 10.3 (82 - 113%)	2 of 21	Attaining	
			<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	<2 - 545	1 of 17 events (in 2002)	Inconclusive	
			Lead (total) µg/L	15 (FBC)	<5 - 35	1 of 22	Attaining	
			Turbidity (former standard) NTU	50 (A&Ww)	1 - > 999	4 of 21	Inconclusive	
Turkey Creek headwaters - Campbell Blue Creek AZ15040004-080 A&Ww, FC, FBC, Agl	ADEQ TMDL Program Above Campbell Blue (Site 1) UGTRY000.17 101180	2001 - 4 field	No exceedances					



**TABLE 21. UPPER GILA WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEARS SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	
	Summary Row A&Wc Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive	2001 4 sampling events	No exceedances					ADEQ collected four field samples in 2001. Assessed as "inconclusive" and placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> , dissolved metals (cadmium, copper, and zinc), and total metals (mercury, copper, and lead).
<b>LAKES MONITORING DATA</b>								
Cluff Pond #3 AZL15040005-0370 A&Ww, FC, FBC, Agl, AgL	AGFD Routine Monitoring UGCRC - MID (mid lake)	2001 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive	2001 1 sampling event						Insufficient monitoring data to assess.
Dankworth Ponds AZL15040006-0440 A&Wc, FC, FBC	ADEQ Lakes Program UGDAN-A 100018	1999 - 1 partial suite 2000 - 3 partial suites	Dissolved oxygen mg/L	7.0 (90% saturation) (A&Wc)	4.4 - 8.1 (50 - 102%)	1 of 4		Low dissolved oxygen due to naturally occurring ground water upwelling, and not anthropogenic causes. Not included in the final assessment.  Lab reporting limits for 3 other selenium samples were too high to use results for chronic standards assessment but sufficient for acute standards.  Note that duplicate selenium sample did not exceed standards
			Selenium µg/L	2 (A&Wc chronic)	<5 - 25	1 of 1		
				20 (A&Wc acute)		1 of 4		
			Turbidity (former standard) NTU	10 (A&Wc)	1 - 27	1 of 2		
	ADEQ Lakes Program UGDAN-B 100987	1999 - 1 field	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	4.4 (50%)	1 of 1		
	ADEQ Lakes Program UGDAN-Spring 1 (pond) 100988	1999 - 1 partial suite 2000 - 3 partial suites	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	3.5 - 3.95 (51 - 58%)	4 of 4		
	ADEQ Lakes Program UGDAN-Springs 2, 3, 4 100990, 100991, 100992	1999 - 1 partial suite (at 3 springs)	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	0.2 - 2.6 (2 - 42%)	3 of 3		
	Summary Row A&Wc Inconclusive FC Attaining FBC Inconclusive	1999 - 2000 12 samples 4 sampling events	Selenium µg/L	2 (A&Wc chronic)	<5 - 25	1 of 1 event	Inconclusive	
Luna Lake AZL15040004-0840 A&Wc, FC, FBC, AgL	AGFD Routine Monitoring UGLUN - A (dam site)	1998 - 3 partial suites	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.5 - 8.0 (87 - 99%)	1 of 3		ADEQ collected 12 samples at 4 sites in 1999-2000. Assessed as "attaining some uses" and placed on the Planning List due to: 1. Selenium exceedances, 2. Missing core parameters: <i>Escherichia coli</i> and dissolved metals (copper, cadmium, and zinc), 3. Former turbidity standard exceedance. Investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed.
				6.5 - 9.0 (A&Wc, FBC, AgL)	8.4 - 9.9	2 of 3		
			pH SU					



TABLE 21. UPPER GILA WATERSHED – 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEARS SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	
	Alpine/Luna Lake Watershed Group 319 Project UGLUN-L1 (wildlife restricted area)	2001 - 4 field 2002 - 8 field	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	2 - 13.4 (22-152%)	5 of 9		
			pH SU	6.5 - 9.0 (A&Wc, FBC, AgL)	8.4 - 9.5	5 of 12		
	Alpine/Luna Lake Watershed Group 319 Project UGLUN - L2 (north of fishing dock)	2001 - 4 field 2002 - 8 field	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	2 - 11.8 (22-130%)	4 of 10		
			pH SU	6.5 - 9.0 (A&Wc, FBC, AgL)	8.7 - 9.5	4 of 12		
	Alpine/Luna Lake Watershed Group 319 Project UGLUN - L3 (3 meters above dam)	2001 - 4 field 2002 - 8 field	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	1.7 - 12.7 (18.6- 140%)	4 of 10		
			pH SU	6.5 - 9.0 (A&Wc, FBC, AgL)	8.6 - 9.6	5 of 12		
	ADEQ Lakes Program UGLUN-A (dam site) 100036	1999 - 1 partial suite 2002 - 1 partial suite	No exceedances					Note samples were taken on the same date at the two ADEQ sites.
	ADEQ Lakes Program UGLUN-B (mid lake) 100979	1999 - 1 partial suite 2002 - 1 partial suite	No exceedances					
	Summary Row  A&Wc Not attaining FC Inconclusive FBC Not attaining AgL Not attaining	1998 - 2002  43 samples 18 sampling events	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	1.7 - 13.4 (18.6 - 152)	14 of 43	Not attaining	A total of 43 samples were collected at 6 sites by ADEQ, AGFD, and the Alpine/Luna Lake Watershed Group (for a 319 implementation project) in 1998 - 2001.  A nutrient TMDL to address pH and dissolved oxygen problems was approved by EPA in 2000. Assessed as "not attaining" due to low dissolved oxygen and pH exceedances.
			pH SU	6.5 - 9.0 (A&Wc, FBC, AgL)	8.4 - 9.93	16 of 43	Not attaining	Placed on the Planning List due to a fish kill in 1999. Fish kill may be evidence of a narrative standard violation.  Also placed on the Planning List for TMDL-follow up monitoring and missing core parameters: turbidity, <i>Escherichia coli</i> , dissolved metals (copper, cadmium, zinc), and total metals (mercury, copper, and lead).
Roper Lake AZL15040006-1250 A&Ww, FC, FBC	ADEQ Lakes Program UGROP - A (dam site) 100080	1998 - 1 partial suites 2000 - 3 partial suites	No exceedances					
	ADEQ Lakes Program UGROP - B (mid lake) 100975	1999 - 1 suite 2000 - 1 suites	No exceedances					
	ADEQ Lakes Program UGROP - Pond 100976	1999 - 1 suite 2000 - 2 suites	No exceedances					
	ADEQ Lakes Program UGROP - Canal 100978	2000 - 3 suites	No exceedances					

**TABLE 21. UPPER GILA WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEARS SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS (MEAN)	FREQUENCY EXCEEDED STANDARD	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row	1998-2000	No exceedances					ADEQ collected 12 samples at 4 sites in 1998-2000. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameter: <i>Escherichia coli</i> .
	A&Ww FC FBC	Attaining Attaining Inconclusive						



TABLE 22. UPPER GILA WATERSHED -- ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
<b>UPPER GILA WATERSHED -- STREAM ASSESSMENTS</b>				
Ash Creek unnamed tributary at 32 45°37'109 52°22' - Gila River 15 miles AZ15040005-040B (Reach was split into warmwater and coldwater segments since last assessment. No current data in 040A.)	A&Ww Inconclusive FC Attaining FBC Attaining Agl Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : dissolved metals (cadmium, copper and zinc).		
Blue River New Mexico border - KP Creek 21 miles AZ15040004-026	A&Wc Inconclusive FC Inconclusive FBC Attaining Agl Inconclusive Agl Inconclusive Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, manganese, lead, and copper).		
Blue River KP Creek - Strayhorse Creek 4 miles AZ15040004-025A (Reach was split into warmwater and coldwater segments since last assessment.)	A&Wc Inconclusive FC Inconclusive FBC Attaining Agl Inconclusive Agl Inconclusive Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : total boron, total metals (mercury, manganese, lead, and copper), and dissolved metals (copper, cadmium, and zinc).		
Blue River Strayhorse Creek - San Francisco River 25 miles AZ15040004-025B (Reach was split into warmwater and coldwater segments since last assessment.)	A&Ww Attaining FC Attaining FBC Attaining Agl Attaining Agl Attaining Category 1 -- Attaining All Uses			
Bonita Creek Park Creek - Gila River 15 miles AZ15040005-030 Unique Water	A&Ww Attaining FC Attaining FBC Attaining DWS Attaining Agl Attaining Category 1 -- Attaining All Uses			
Campbell Blue Creek headwaters - Blue River 20 miles AZ15040004-028	A&Wc Inconclusive FC Attaining FBC Attaining Agl Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameter</u> : dissolved copper.		
Cave Creek headwaters - South Fork of Cave Creek 8 miles AZ15040006-852A Unique Water (Reach was split into warmwater and coldwater segments since last assessment.)	A&Wc Impaired FC Attaining FBC Attaining Agl Attaining Agl Attaining Category 5 -- Impaired		Add selenium to the 2004 303(d) List due to chronic exceedances in 2 of 2 sampling events).	

**TABLE 22. UPPER GILA WATERSHED -- ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

<b>SURFACE WATER DESCRIPTION</b>	<b>2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS</b>	<b>2004 PLANNING LIST</b>	<b>STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST</b>	<b>OTHER INFORMATION</b>
Cave Creek South Fork of Cave Creek - USFS boundary 2 miles AZ15040006-852B Unique Waters (Reach was split into warmwater and coldwater segments since last assessment.)	A&Ww Inconclusive FC Attaining FBC Attaining Agl Attaining AgL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to former turbidity standard exceedance (1 of 9 samples). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.		
Cave Creek, North Fork headwaters - Cave Creek 6 miles AZ15040006-856	A&Wc Inconclusive FC Inconclusive FBC Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Cave Creek, South Fork headwaters - Cave Creek 8 miles AZ15040006-849 Unique Water	A&Wc Attaining FC Attaining FBC Inconclusive Agl Attaining AgL Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <i>Escherichia coli</i> exceedance (1 of 10 sampling events, occurred in 2000).		
Eagle Creek headwaters - unnamed tributary at 33 23°24'N/109 29°35'W 12 miles AZ15040005-028A (Reach was split into warmwater and coldwater segments since last assessment. No current data in 028B.)	A&Wc Inconclusive FC Inconclusive FBC Attaining DWS Inconclusive Agl Inconclusive AgL Inconclusive Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : total boron, total metals (mercury, arsenic, chromium, lead, manganese, and copper), and dissolved metals (copper, cadmium, and zinc).		
Eagle Creek Willow Creek - Sheep Wash 6 miles AZ15040005-027	A&Ww Attaining FC Attaining FBC Attaining DWS Attaining Agl Attaining AgL Attaining Category 1 -- Attaining All Uses			
Eagle Creek Sheep Wash - Gila River 25 miles AZ15040005-025	A&Ww Attaining FC Attaining FBC Attaining DWS Attaining Agl Attaining AgL Attaining Category 1 -- Attaining All Uses			
East Turkey Creek headwaters - unnamed tributary at 31 46°22'N/109 21°17'W 8 miles AZ15040006-837A (Reach was split into warmwater and coldwater segments since last assessment. No current data in 837B.)	A&Wc Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Frye Canyon Creek headwaters - Frye Mesa Reservoir 5 miles AZ15040005-988A (Reach was split into warmwater and coldwater segments since last assessment. No current data in 988B.)	A&Wc Inconclusive FC Inconclusive FBC Attaining DWS Inconclusive Agl Inconclusive Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : dissolved metals (copper, cadmium, and zinc) and total metals (mercury, arsenic, chromium, lead, and copper).		



**TABLE 22. UPPER GILA WATERSHED -- ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

<b>SURFACE WATER DESCRIPTION</b>	<b>2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS</b>	<b>2004 PLANNING LIST</b>	<b>STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST</b>	<b>OTHER INFORMATION</b>
Gila River New Mexico border - Bitter Creek 16 miles AZ15040002-004	A&Ww Inconclusive FC Attaining FBC Attaining Agl Attaining Agl Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>chronic selenium</u> exceedance (1 of 1 sampling event).  <u>Remove turbidity</u> from Planning List as turbidity is attaining standards (no exceedances in 4 samples).		
Gila River Skully Creek - San Francisco River 15 miles AZ15040002-001	A&Ww Impaired FC Attaining FBC Inconclusive Agl Attaining Agl Attaining Category 5 -- Impaired	On the Planning List due to: 1. Low <u>dissolved oxygen</u> (1 of 9 samples). 2. <u>Lead</u> exceedance (1 of 8 samples).	<u>Add selenium</u> to the 303(d) List due to chronic selenium exceedances (3 of 3 sampling events).	
Gila River San Francisco River - Eagle Creek 3 miles AZ15040005-024	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 3 -- Inconclusive	On the Planning List. No current monitoring data. Added to the Planning List in 2002 due to former <u>turbidity</u> standard exceedances (12 of 12 samples). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.		EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
Gila River Eagle Creek - Bonita Creek 10 miles AZ15040005-023	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 3 -- Inconclusive	On the Planning List. No current monitoring data. Added in 2002 due to former <u>turbidity</u> standard exceedances (9 of 12 samples). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.		EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
Gila River Bonita Creek - Yuma Wash 6 miles AZ15040005-022	A&Ww Inconclusive FC Attaining FBC Impaired Agl Attaining Agl Attaining Category 5 -- Impaired	On the Planning List due to: 1. Copper exceedances (1 of 23 samples), 2. <u>Lead</u> exceedances (4 of 21 samples), 3. <u>Suspended sediment concentration</u> (SSC) geometric mean exceedance. 4. Former <u>turbidity</u> standard exceedances (7 of 24 samples). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.	<u>Add Escherichia coli</u> to the 303(d) List due to exceedances in 2 of 8 sampling events.  <u>Delist turbidity</u> . The turbidity standard was repealed in 2002. Add to the Planning List due to exceedances of the former standard.	EPA may also use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
K P Creek headwaters - Blue River 12 miles AZ15040004-029 Unique Water	A&Wc Inconclusive FC Inconclusive FBC Attaining Agl Inconclusive Category 2 -- Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : dissolved metals (copper cadmium, and zinc) and total metals (mercury, lead, and copper).		
San Francisco River headwaters - New Mexico border 13 miles AZ15040004-023	A&Wc Inconclusive FC Attaining FBC Attaining Agl Attaining Agl Attaining Category 2 -- Attaining Some Uses	On the Planning List due to former <u>turbidity</u> standard exceedances (6 of 9 samples). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.  <u>Remove dissolved oxygen</u> from the Planning List, as current data indicate that uses are being attained (only 1 of 10 samples did not meet the standard).		EPA may also use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
San Francisco River New Mexico border - Blue River 21 miles AZ15040004-004	A&Ww Inconclusive FC Attaining FBC Attaining Agl Attaining Agl Attaining Category 2 -- Attaining Some Uses	On the Planning List due to former <u>turbidity</u> standard exceedance (1 of 6 samples). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.		

TABLE 22. UPPER GILA WATERSHED -- ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
San Francisco River Blue River - Limestone Gulch 19 miles AZ15040004-003	A&Ww    Attaining FC        Attaining FBC      Inconclusive Agl      Attaining Agl      Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>Escherichia coli</u> exceedance (1 of 13 sampling events, occurred in 2002).  Remove turbidity and beryllium from the Planning List. Data indicate that uses are being attained. Turbidity exceeded standards in only 3 of 16 samples. Arizona's beryllium standard was modified in 2002, and beryllium is not exceeding the new standards.		
San Francisco River Limestone Gulch - Gila River 13 miles AZ15040004-001	A&Ww    Inconclusive FC        Attaining FBC      Inconclusive Agl      Attaining Agl      Attaining Category 2 -- Attaining Some Uses	On the Planning List due to: 1. <u>Copper</u> exceedance (1 of 22 sampling events, occurred in 2000). 2. <u>Escherichia coli</u> exceedance (1 of 17 sampling events, occurred in 2002). 3. Former turbidity standard exceedances (4 of 21 samples). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.	Delist turbidity. The turbidity standard was repealed in 2002. Add to the Planning List due to exceedances of the former standard.	EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
Turkey Creek headwaters - Campbell Blue Creek 5 miles AZ15040004-060	A&Wc    Inconclusive FC        Inconclusive FBC      Inconclusive Agl      Inconclusive Category 3 -- Inconclusive	On the Planning List due to <u>missing core parameters</u> : <u>Escherichia coli</u> , dissolved metals (cadmium, copper, and zinc), and total metals (mercury, copper, and lead).		
<b>UPPER GILA WATERSHED -- LAKE ASSESSMENTS</b>				
Cliff Pond #3 15 acres AZL15040005-0370	A&Ww    Inconclusive FC        Inconclusive FBC      Inconclusive Agl      Inconclusive Agl      Inconclusive Category 3 -- Inconclusive Trophic status not calculated	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Dankworth Ponds 8 acres AZL15040006-0440	A&Wc    Inconclusive FC        Attaining FBC      Inconclusive Category 2 -- Attaining Some Uses Trophic status -- Mesotrophic	On the Planning List due to: 1. <u>Selenium</u> exceedance (1 of 4 sampling events, occurred in 2000). 2. Former turbidity standard exceedance (1 of 2 samples). Investigation into the causes and sources of turbidity will be investigated during the next monitoring cycle for this watershed. 3. <u>Missing core parameters</u> : <u>Escherichia coli</u> and dissolved metals (copper, cadmium, and zinc).		
Luna Lake 120 acres AZL15040004-0840	A&Wc    Not attaining FC        Inconclusive FBC      Not attaining Agl      Not attaining Category 4A -- Not Attaining  Trophic status -- Eutrophic	On the Planning List for: 1. TMDL follow-up monitoring for low <u>dissolved oxygen</u> (14 of 43 samples) and <u>high pH</u> (16 of 43 samples). 2. <u>Missing core parameters</u> : <u>Escherichia coli</u> , turbidity, dissolved metals (copper cadmium, and zinc), and total metals (mercury, copper, and lead). 3. <u>Fish kill</u> in 1999.		Nutrient TMDL to address low dissolved oxygen, high pH, and recurrent fish kills was approved by EPA in 2000. Placed on the Planning List in 2002 for TMDL follow-up monitoring.  Fish kill in 1999 due to algal bloom die-off and associated high pH and low dissolved oxygen. This may be evidence of a narrative nutrient standard violation.
Roper Lake 25 acres AZL15040006-1250	A&Ww    Attaining FC        Attaining FBC      Inconclusive Category 2 -- Attaining Some Uses  Trophic status -- Mesotrophic	On the Planning List due to <u>missing core parameter</u> : <u>Escherichia coli</u> .		





*Spring Creek, a tributary of Oak Creek, east of Clarkdale, Arizona.*

## The Verde Watershed

This watershed is defined by the Verde River drainage that flows into the Salt River, including Big Chino Wash and its tributaries. The Verde River and many of its tributaries are perennial waters.

This 6,624 square mile watershed has an approximate population of 153,000 people (2000 census). Although this is only 3% of the state population, several communities are located in this watershed: Payson, Sedona, Cottonwood, Verde Valley, Prescott, and the southern outskirts of Flagstaff. Land ownership is approximately: 23% private land, 10% state land, 65% federal land, and 2% Tribal land. Primary land uses are open range grazing, irrigated agriculture, recreation, forestry, and some mining.

Elevations range from more than 12,000 feet (above sea level) in the San Francisco Mountains to about 1,600 feet as the Verde River flows into the Salt River. The watershed is split between warmwater aquatic communities below 5,000 feet, and coldwater communities above 5,000 feet where perennial waters exist.

**The assessment** – Assessments were completed for 45 stream reaches and 14 lakes in this watershed. Of the 510 stream miles assessed, 31 miles were attaining all uses (two reaches), and 72 miles (seven reaches) were assessed as impaired or not attaining a use. Of the 4,898 lake acres assessed, none were attaining all uses, and 260 acres (three lakes) were assessed as impaired or not attaining a use. All others were inconclusive or attaining some uses.

A watershed assessment map follows on the next page, illustrating stream and lake assessments by category. The Verde **monitoring table** (Table 23) following the map summarizes the water quality data used in the assessment. It is followed by the **assessment table** (Table 24), which bridges current assessments with past assessments and impaired water identification. Important to note in this table are comments regarding previous 303(d) lists (what has been added and removed), category designations (1 through 5), references to potential actions by EPA, and status of TMDLs.

More detailed information on how to use these tables can be found at the beginning of this chapter (p. IV-1). Assessment methods and criteria can be found in Chapter III.

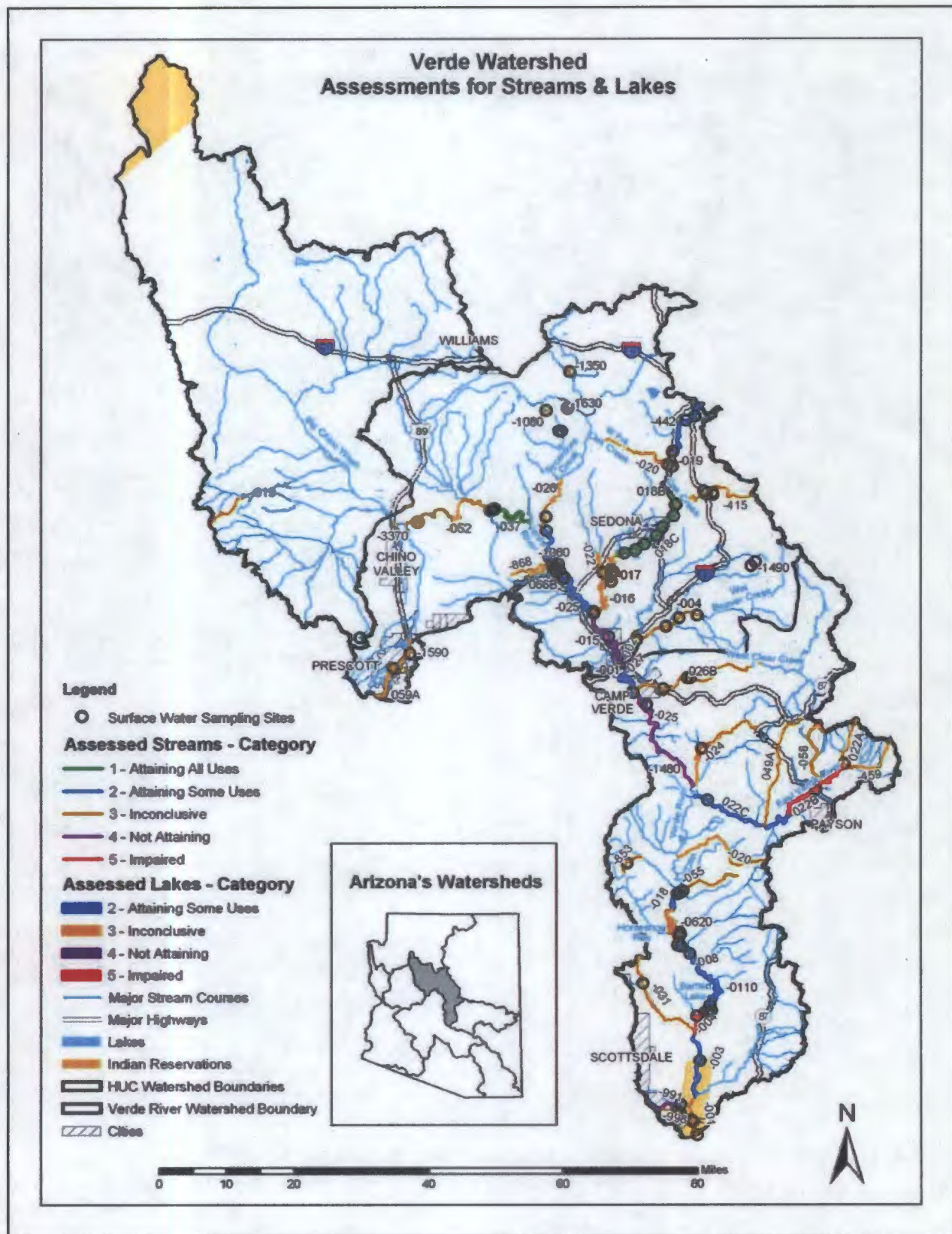


Figure 24. Watershed monitoring and assessments



**TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
STREAM MONITORING DATA								
Beaver Creek Dry Beaver Creek - Verde River AZ15060202-002 A&Ww, FC, FBC, AgL	ADEQ TMDL Program At SILT0001 VRBEV003.27	1999 - 4 partial suite	Turbidity (former standard) NTU	50 (A&Ww)	5 - 190	1 of 3		
	ADEQ Ambient Monitoring and TMDL Program at Camp Verde VRBEV003.18 100496	1998 - 3 field 1999 - 5 field + 1 partial suite	Turbidity (former standard) NTU	50 (A&Ww)	2 - 117	3 of 8		
	ADEQ TMDL Program Montezuma's Castle VRBEV002.62 100708	1999 - 5 field + 1 partial	Turbidity (former standard) NTU	50 (A&Ww)	2 - 216	1 of 6		
	USGS Ambient Monitoring VRBEV02.44 101542	2002 - 1 partial suite	No exceedances					
	ADEQ TMDL Program at Foam0001 VRBEV002.02	2000 - 2 partial suites	No exceedances					
	ADEQ Ambient Monitoring and TMDL Program VRBEV001.28 101348	1999 - 6 partial suites	No exceedances					
	ADEQ Ambient Monitoring Above Verde River VRBEV000.62 100722	1999 - 1 partial suite	No exceedances					
	Summary Row  A&Ww      Inconclusive FC        Inconclusive FBC       Inconclusive AgL       Inconclusive	1998-2000  23 samples 12 sampling events	Turbidity (former standard) NTU	50 (A&Ww)	2 - 190	5 of 26	Inconclusive	ADEQ and USGS collected a total of 23 samples at 7 sites from 1998-2002. Assessed as "inconclusive" due to exceedances of the former turbidity standard.  Reach was on the 2002 303(d) List due to turbidity. The Aquatic and Wildlife use is assessed as "inconclusive" and placed on the Planning List due to exceedances of the former turbidity standard. Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.  Also on the Planning List due to missing core parameters: <i>Escherichia coli</i> , dissolved metals (cadmium, copper, and zinc), and total metals (mercury, copper, and lead).



TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
Camp Creek headwaters - Verde River AZ15060203-031 A&Ww, FC, FBC, AgL	ADEQ BioCriteria Program Above Blue Wash confluence VRCMP009.30 100760	1998 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances					Insufficient monitoring data to assess.
Colony Wash headwaters - Fort McDowell Indian Reservation AZ15060203-998 A&Ww, PBC	USGS Special Investigation VRCLW001.43 101519	1998 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive PBC Inconclusive	1998 1 sampling event	No exceedances					Insufficient monitoring data to assess.
East Verde River headwaters - Ellison Creek AZ15060203-022A A&Ww, FC, FBC, DWS, AgL	ADEQ Ambient Monitoring Above Second Crossing VREVR015.97 100786	1999 - 2 full suites	Turbidity (former standard) NTU	10 (A&Ww)	26 - 54	2 of 2		Lab reporting limits for dissolved copper were too high to use results for assessment.
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive AgL Inconclusive AgL Inconclusive	1999 2 sampling events	Turbidity (former standard) NTU	10 (A&Ww)	27 - 54	2 of 2		The reach is assessed as "inconclusive" due to insufficient monitoring data and exceedances of the former turbidity standard. Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring. Missing core parameters: dissolved copper.
East Verde River Ellison Creek - American Gulch AZ15060203-022B A&Ww, FC, FBC, DWS, AgL	ADEQ / USGS Fixed Station Above Highway 87 bridge VREVR012.28 100474	1998 - 1 partial suite 1999 - 5 full suites 2000 - 3 full suites 2001 - 4 full suites 2002 - 5 full suites	Lead (total) µg/L	15 (DWS, FBC)	<5 - 21	1 of 18		
			Mercury (total) µg/L	0.6 (FC)	<0.5 - 1.2	1 of 18		
			Nitrogen (total) µg/L	3.0 (A&Ww)	<0.05 - 4.8	1 of 18		
			Selenium (total) µg/L	2 (A&Ww chronic)	<5 - 5.3	2 of 2		Lab reporting limits for 16 other samples were too high to use results for assessment.
			Turbidity (former standard) NTU	50 (A&Ww)	2.16 - >1000	3 of 16		
	Summary Row A&Ww Impaired FC Attaining FBC Attaining DWS Attaining AgL Attaining AgL Attaining	1998-2002 18 samples 18 sampling events	Lead (total) µg/L	15 (DWS, FBC)	<5 - 21	1 of 18	Attaining	USGS collected 16 samples in 1998-2002. Assessed as "Impaired" due to selenium exceedances.
			Mercury (total) µg/L	0.6 (FC)	<0.5 - 1.2	1 of 18	Attaining	
			Nitrogen (total) µg/L	3.0 (A&Ww)	<0.05 - 4.8	1 of 18	Attaining	



**TABLE 23. VERDE WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
East Verde River American Gulch - Verde River AZ15060203-022C A&Ww, FC, FBC, DWS, Agl, Agl	USGS Station #09507980 Near Childs VREVR001.42 100739	1998 - 6 full suites 1999 - 5 full suites 2000 - 4 full suites 2001 - 4 full suites 2002 - 4 full suites	Selenium (total) µg/L	2 (A&Ww chronic)	<5 - 5.3	2 of 2 events	Impaired	
			Turbidity (former standard) NTU	50 (A&Ww)	2.16 - >1000	3 of 16	Attaining	
			Arsenic (dissolved) µg/L	360 (A&Ww acute)	4 - 388	1 of 23		Arsenic concentrations naturally high in ground water. Ground water upwelling when surface flows are less than 5 cfs results in high arsenic levels in the stream and is a natural occurrence. Not included in final assessment.
				190 (A&Ww chronic)		2 of 23		
			Arsenic (total) µg/L	50 (DWS, FBC)	4.0 - 394	7 of 23		
			Boron (total) µg/L	630 (DWS)	50 - 1730	4 of 20		
				1000 (Agl)		2 of 20		
			Dissolved oxygen mg/L	>8 (90% saturation) (A&Ww)	5.6 - 10.6	1 of 23		Low dissolved oxygen due to naturally occurring ground water upwelling. Not included in final assessment.
	Summary Row A&Ww Attaining FC Attaining DWS Inconclusive Agl Attaining Agl Attaining	1998-2002 23 samples 23 sampling events	Boron (total) µg/L	630 (DWS)	50 - 1730	4 of 20	Inconclusive	USGS collected 23 samples in 1998-2002. Assessed as "attaining some uses" and placed on the Planning List due to boron exceedances.
				1000 (Agl)		2 of 20	Attaining	ADEQ is considering a Use Attainability Analysis for Domestic Water Source due to high levels of arsenic (and possibly boron) that are naturally occurring in the water when an inter-basin transfer of water is not being added to the East Verde from East Clear Creek to maintain flow.
Fossil Creek headwaters - Verde River AZ15060203-024 A&Ww, FC, FBC, AgL	ADEQ Ambient Monitoring Above Salley Mae Wash VRFOS005.67 100785	1999 - 2 full suites	No exceedances					Both samples were collected in the summer.
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive	1999 2 sampling events	No exceedances					Insufficient monitoring data to assess.

TABLE 23. VERDE WATERSHED – 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
Grande Wash headwaters - Ashbrook Wash 15060203-991 A&Ww, FBC, FC (tributary rule)	USGS Special Investigation VRGRW000.30 101598	1998 - 1 full suite 1999 - 1 full suite 2000 - 1 partial suite	<i>Escherichia coli</i> CFU/100 ml	235	1000 - >20,000	2 of 2		Lab reporting limits for dissolved cadmium were too high to assess standards.
	Summary Row  A&Ww Inconclusive FBC Not attaining FC Inconclusive	1998 - 2000  3 sampling events	<i>Escherichia coli</i> CFU/100 ml	235	1000 - >20,000	2 of 2 events (in 1999 and 2000)	Not attaining	USGS collected 3 samples in 1998 - 2000. Assessed as "not attaining" due to <i>Escherichia coli</i> exceedances. Fountain Hills WWTP has now changed disposal method to recharge, thereby eliminating discharges to this wash. <i>E. coli</i> levels are expected to meet water quality standards for the next assessment. Placed on the Planning List for follow-up monitoring to verify water quality problems have been resolved.  Also placed on the Planning List due to missing core parameters: dissolved oxygen, turbidity/SSC, dissolved cadmium, and total mercury.
Granite Creek headwaters - Willow Creek AZ15060202-059A A&Wc, FC, FBC, Agl, AgL	USGS Ambient Monitoring #09502960 VRGRA021.70 101580	1998 - 1 partial suite 1999 - 2 partial suites 2000 - 2 partial suites 2001 - 1 partial suite	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample max.)	71 - >8000	2 of 4		The lab reporting limits for some cadmium and copper analysis were too high to use results for assessment.
				126 (FBC geometric mean)	71 - >8000	overall geometric mean = 406		One <i>E. coli</i> exceedance was during a very high flow event. (Insufficient samples for 30-day geo mean)
			Dissolved oxygen mg/L	> 7.0 (10% saturation) (A&Wc)	4.3 - 10.8 (53 - 162%)	3 of 5		
			Mercury (dissolved) µg/L	0.01 (A&Wc chronic)	<0.1 - 0.3	1 of 2		Lab reporting limit for 2 other mercury samples were too high to use results for assessment.
	AGFD Ambient Monitoring VRGRA021.46	2000 - 1 partial suite	Dissolved oxygen	>7.0 (90% saturation) (A&Wc)	6.2 (77.1%) saturation	1 of 1		May be natural condition. Sample taken in July 2000 during a drought.



TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	Summary Row	1998-2001 7 sampling events	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	71 - >8000	2 of 4 events (in 2000 and 2001)	Inconclusive (see comment)	USGS and AGFD collected a total of 7 samples at 2 sites in 1998-2001. Assessed as "Inconclusive" and placed on the Planning List due to <i>Escherichia coli</i> and mercury exceedances, low dissolved oxygen, and missing core parameters: turbidity/TSS, total metals (copper, lead, manganese, and mercury) and dissolved metals (cadmium and copper).  ADEQ has assessed the FBC designated use as "Inconclusive" for the following reasons: 1. One of the two <i>E. coli</i> exceedances was close to the standard (result is 300, standard is 235) and bacterial lag methods provide an estimate of bacteria numbers (most probable number). (See discussion in Chapter III.) 2. Need at least 5 bacteria samples within a 30-day period to determine the 30-day geometric mean. (The Impaired Water Identification Rule requires 2 exceedances of the 30-day geometric mean and does not recognize the overall geometric mean established in the newly adopted Surface Water Standards.)
	A&Wc FC FBC AgI AgL	Inconclusive Inconclusive Inconclusive Inconclusive Inconclusive		126 (FBC - geo mean)	71 - >8000	overall geometric mean = 406	Inconclusive (need two exceedances of 30-day geometric mean - see comment)	
			Dissolved oxygen mg/L	>7.0 (90% saturation) (A&Wc)	4.3 - 10.8 (53 - 162%)	4 of 6	Inconclusive	
			Mercury (dissolved) µg/L	0.01 (A&Wc chronic)	<0.1 - 0.3	1 of 2 events	Inconclusive	
Munds Creek headwaters - Oak Creek AZ15080202-415 A&Ww, FC, FBC (tributary rule)	ADEQ TMDL Program Above O'Dell Lake VRMUN004.3	1998 - 3 partial suites	Turbidity (former standard) NTU	50 (A&Ww)	5 - 69	1 of 3		
	ADEQ TMDL Program Southeast trib to O'Dell Lake VRMUN004.1	1998 - 2 partial suites	No exceedances					
	ADEQ TMDL Program West trib of Munds Creek Above Pinewood WWTP VRMUN003.5	1998 - 3 partial suites	Turbidity (former standard) NTU	50 (A&Ww)	5 - 67	1 of 3		
	ADEQ TMDL Program Below Pinewood WWTP VRMUN003.4	1998 - 3 partial suites	No exceedances					
	ADEQ TMDL Program Above Oak Creek VRMUN000.1	1998 - 3 partial suites	No exceedances					
	Summary Row A&Ww FC FBC	1998 14 samples 3 sampling events	Turbidity (former standard) NTU	50 (A&Ww)	4 - 69	2 of 14 (same sampling event)	Attaining	ADEQ collected 14 samples at 5 sites in 1998. Assessed as "Inconclusive" and placed on the Planning List due to insufficient seasonal representation and missing core parameters.  Missing core parameters: dissolved metals (copper, cadmium, and zinc), and total mercury. All samples were collected in March, April, and May.



TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
Oak Creek headwaters - West Fork Oak Creek AZ15060202-019 A&Wc, FC, FBC, DWS, Agl, Agl Unique Water	ADEQ TMDL Program Above Pumphouse Wash VROAK025.3	1998 - 4 partial suites	No exceedances					
	ADEQ TMDL Program Below Pumphouse Wash VROAK025.2	1998 - 4 partial suites	Turbidity (former standard) NTU	10 (A&Wc)	1 - 20	2 of 4		
	ADEQ Biocriteria Program Below Cave Springs Camp VROAK023.21 100608	1998 - 1 partial suite	No exceedances					
	Summary Row  A&Wc: inconclusive FC: inconclusive FBC: inconclusive DWS: inconclusive Agl: inconclusive Agl: inconclusive	1998 9 samples 5 sampling events	Turbidity (former standard) NTU	10 (A&Wc)	1 - 20	2 of 8	Inconclusive (see comment)	ADEQ collected 9 samples at 3 sites in 1998. Assessed as "inconclusive" and placed on the Planning List due to missing core parameters and exceedances of the former turbidity standard. Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.  Missing core parameters: total fluoride, total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, arsenic, chromium, lead, manganese, and copper).
Oak Creek At Slide Rock State Park only AZ15060202-018B A&Ww, FC, FBC, DWS, Agl, Agl Unique Water	ADEQ TMDL Program Above Slide Rock VROAK020.03	1998 - 1 pH, nutrients	No exceedances					
	Slide Rock State Park <i>Escherichia coli</i> Monitoring Upstream VROAK020.00A	1998 - 2002 685 <i>Escherichia coli</i> samples only	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample max)	0 - 2419	39 of 682		
	Slide Rock State Park <i>Escherichia coli</i> Monitoring Mid-slide VROAK020.00B	1998 - 2002 680 <i>Escherichia coli</i> samples only	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample max)	0 - 2419	32 of 680		
	Slide Rock State Park <i>Escherichia coli</i> Monitoring Large Pool VROAK020.00C	1998 - 2002 682 <i>Escherichia coli</i> samples only	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample max)	0 - 2419	43 of 680		
	Slide Rock State Park Foot Bridge <i>Escherichia coli</i> Monitoring VROAK020.00D	1998 - 2002 682 <i>Escherichia coli</i> samples only	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample max)	0 - 2419	101 of 682		
	Slide Rock State Park at Highway Bridge <i>Escherichia coli</i> Monitoring VROAK020.00E	1998 - 2002 679 <i>Escherichia coli</i> samples only	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample max)	0 - 2419	54 of 682		



TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	ADEQ/TMDL Below Slide Rock VROAK019.97	1998 - 1 partial suite	No exceedances					
	Summary Row  A&Ww Inconclusive FC Inconclusive FBC Not attaining DWS Inconclusive Agl Inconclusive AgL Inconclusive	1998-2002  3408 <i>Escherichia coli</i> samples 2 other sampling events	<i>Escherichia coli</i> CFU/100 ml	235 (FBC single sample maximum)	0 - 2410	289 of 3408 samples 101 of 682 sampling events	Not attaining	ADEQ collected 2 samples at 2 sites in 1998. Slide Rock State Park collected a total of 3408 <i>Escherichia coli</i> samples at 5 sites in 1998-2002. <i>Escherichia coli</i> TMDLs were approved by EPA in 1999.  Assessed as "not attaining" due to <i>Escherichia coli</i> exceedances and placed on the Planning List for TMDL follow-up monitoring and for missing core parameters.  Also placed on the Planning List due to beach closures following elevated levels of <i>Escherichia coli</i> . Beach closures have occurred every summer during the assessment period.  Missing core parameters: total fluoride, total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, arsenic, chromium, lead, manganese, and copper).
Oak Creek Below Slide Rock State Park- Dry Creek AZ15060202-018C A&Ww, FC, FBC, DWS, Agl, Agl Unique Water	ADEQ TMDL Program Above Munds Creek VROAK018.3	1998 - 3 partial suites	No exceedances					
	ADEQ TMDL Program Below Munds Creek VROAK018.1	1998 - 3 partial suites	No exceedances					
	ADEQ Ambient Monitoring Below Grasshopper Point VROAK016.57 100459	1998 - 3 partial suites	No exceedances					
	ADEQ Ambient Monitoring At Highway 179 bridge VROAK014.54 100460	1998 - 3 full suites	No exceedances					
	ADEQ Ambient Monitoring At Chavez Crossing VROAK013.11 100461	1998 - 3 full suites	No exceedances					
	ADEQ TMDL Program Below Redrock Crossing VROAK011.4	1998 - 1 partial suites (2 samples, only 2 days apart)	No exceedances					
	ADEQ Biocriteria Program At Red Rock State Park VROAK010.29 100612	1999 - 1 full suite	No exceedances					

TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	ADEQ Fixed Station Network At Redrock Crossing VROAK009.33 100492	1998 - 4 full suites 1999 - 4 full suites 2000 - 4 full suites 2001 - 4 full suites 2002 - 4 full suites	Beryllium (total) µg/L	4.0 (DWS, FBC)	<0.5 - 4.1	1 of 20		
			Manganese (total) µg/L	980 (DWS)	<50 - 1300	1 of 20		
			Total Nitrogen mg/L	2.5 Unique Water (A&Ww)	<0.5 - 4.97	1 of 19		
			Total Phosphorus mg/L	0.3 Unique Water (A&Ww)	< 0.02 - 1.5	1 of 20		
			Turbidity (former standard) NTU	50 (A&Ww)	1 - >1000	2 of 20		
	Summary Row	1998 - 2002	Beryllium (total) µg/L	4.0 (DWS, FBC)	<0.5 - 4.1	1 of 29	Attaining	ADEQ collected 37 samples at 8 sites in 1998-2002. Assessed as "attaining all uses."
	A&Ww	Attaining	Manganese (total) µg/L	980 (DWS)	<50 - 1300	1 of 29	Attaining	
	FC	Attaining	Total Nitrogen mg/L	2.5 Unique Water (A&Ww)	<0.5 - 4.97	1 of 37	Attaining	
	FBC	Attaining	Total Phosphorus mg/L	0.3 Unique Water (A&Ww)	< 0.02 - 1.5	1 of 37	Attaining	
	DWS	Attaining	Turbidity (former standard) NTU	50 (A&Ww)	1 - >1000	2 of 37	Attaining	
	Agl	Attaining						
	Agl	Attaining						
Oak Creek Dry Creek - Spring Creek AZ15060202-017 A&Ww, FC, FBC, DWS, Agl, Agl Unique Water	ADEQ TMDL Program At Page Springs Bridge VROAK008.4	1998 - 1 partial suite	No exceedances					
	ADEQ Ambient Monitoring Below Page Springs VROAK005.91 100613	1999 - 1 partial suite	No exceedances					
	Summary Row	1998 - 1999	No exceedances					Insufficient monitoring data to assess.
	A&Ww	Inconclusive						
	FC	Inconclusive						
	FBC	Inconclusive						
	DWS	Inconclusive						
	Agl	Inconclusive						
	Agl	Inconclusive						



**TABLE 23. VERDE WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
Oak Creek Spring Creek - Verde River AZ15060202-016 A&Ww, FC, FBC, DWS, AgL, AgL Unique Water	ADEQ TMDL Program Above Mormon Crossing VROAK004.9	1998 - 1 partial suite	No exceedances					
	ADEQ TMDL Program Above Verde River VROAK000.1	1998 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive AgL Inconclusive AgL Inconclusive	1998 2 samples 1 sampling event	No exceedances					Insufficient monitoring data to assess.
Oak Creek, West Fork headwaters - Oak Creek AZ15060202-020 A&Wc, FC, FBC, AgL Unique Water	ADEQ Biocriteria Program Above Fourth Trail Crossing VRWOK000.64 100693	1998 - 1 partial suite	No exceedances					
	Summary Row A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances					Insufficient monitoring data to assess.
Pumphouse Wash headwaters - Oak Creek AZ15060202-442 A&Wc, FC, FBC (tributary rule)	ADEQ TMDL Program Above Kachina Village VRPMW008.4	1998 - 3 partial suites	Total Phosphorus mg/L	1.0 (A&Ww single sample maximum)	0.21 - 2.04	1 of 3		
			Turbidity (former standard) NTU	50 (A&Ww)	44 - 690	2 of 3		
	ADEQ TMDL Program Below Kachina Village VRPMW007.5	1998 - 3 partial suites	No exceedances					
	ADEQ TMDL Program Above Oak Creek VRPMW002.7	1998 - 4 partial suites	No exceedances					
	ADEQ Fixed Station Network Below Highway 89A bridge VRPMW002.63 100495	1998 - 1 field, dissolved copper and cadmium	No exceedances					
	Summary Row A&Wc Inconclusive FC Inconclusive FBC Attaining	1998 11 samples 5 sampling events	Total Phosphorus mg/L	1.0 (A&Ww single sample maximum)	0.214 - 2.04	1 of 10	Attaining	ADEQ collected 11 samples at 4 sites in 1998. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: dissolved metals (copper, cadmium, and zinc), and total mercury.
			Turbidity (former standard) NTU	50 (A&Ww)	44 - 690	2 of 10	Attaining	



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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
Roundtree Canyon Creek headwaters - Tangle Creek AZ15080203-853 A&Ww, FC, FBC, AgL	ADEQ Biocriteria Program 3 miles above Tangle Creek VRROU001.79 100631	1998 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances					Insufficient monitoring data to assess.
Spring Creek Coffee Creek - Oak Creek AZ15080202-022 A&Ww, FC, FBC, AgL, AgL	ADEQ Biocriteria Program Near road crossing VRSPN001.36 100650	1998 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances					Insufficient monitoring data to assess.
Sycamore Creek Cedar Creek - Verde River AZ15080202-026 A&Ww, FC, FBC, AgL, AgL	ADEQ Ambient Monitoring Below Summers Springs VRSYW001.4 100199	1998 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances					Insufficient monitoring data to assess.
Sycamore Creek headwaters - Verde River AZ15080203-055 A&Ww, FC, FBC, AgL	ADEQ Biocriteria Program Tributary of Horseshoe Res. VRSYH000.16 100656	1998 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances					Insufficient monitoring data to assess.
Verde River Granite Creek - Hell Canyon AZ15080202-052 A&Ww, FC, FBC, AgL, AgL	ADEQ Biocriteria Program East of Paulden VRVER095.73 100764	1998 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive	1998 1 sampling event	No exceedances					Insufficient monitoring data to assess.



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STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
Verde River Hell Canyon - unnamed reach 15060202-065 AZ15060202-038 A&Ww, FC, FBC, Agl, AgL	ADEQ Ambient Monitoring Above Perkinsville bridge VRVER095.54 100672	1999 - 1 full suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive	1999 1 sampling event	No exceedances					Insufficient monitoring data to assess.
Verde River unnamed reach 15060202-065 - Railroad Draw AZ15060202-227 A&Ww, FC, FBC, Agl, AgL	USGS Special study VRVER095.74 101569	2002 - 1 nutrients + selenium (dissolved)	No exceedances					
	ADEQ Ambient Monitoring Below Perkinsville Bridge VRVER095.65 100487	1998 - 1 full suite 1999 - 6 full suites 2000 - 3 full suites 2001 - 3 full + 1 partial suite 2002 - 3 full suites	Arsenic (total) µg/L	50 (FBC)	5 - 240	1 of 17		
			Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	5.7 - 10.3 (76 - 144 %)	1 of 16		
			<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	0 - 2,300	1 of 15		Exceedance during high flow event.
			Mercury (total) µg/L	0.6 (FC)	<0.5 - 0.79	1 of 17		
			Turbidity (former standard) NTU	50 (A&Ww)	7 - 677	3 of 17		
	Summary Row A&Ww Attaining FC Attaining FBC Attaining Agl Attaining AgL Attaining	1998-2002 18 samples 18 sampling events	Arsenic (total) µg/L	50 (FBC)	5 - 240	1 of 17	Attaining	ADEQ and USGS collected 18 samples at 2 sites in 1998-2002. Assessed as "attaining all uses."
			Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	5.7 - 10.3 (76 - 144 %)	1 of 16	Attaining	
			<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	0 - 2,300	1 of 15 events (none in last 3 years)	Attaining	
			Mercury (total) µg/L	0.6 (FC)	<0.5 - 0.79	1 of 17	Attaining	
			Turbidity (former standard) NTU	50 (A&Ww)	7 - 677	3 of 17	Attaining	
Verde River Sycamore Creek - Oak Creek AZ15060202-025 A&Ww, FC, FBC, Agl, AgL	USGS Fixed Station #09504000 Near Clarkdale VRVER091.61 100738	1998 - 6 full suites 1999 - 4 full suites 2000 - 4 full suites 2001 - 4 full suites 2002 - 5 full suites	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	0 - 240	1 of 23		
			Mercury (dissolved) µg/L	0.01 (A&Ww chronic)	<0.1 - 0.1	1 of 1		

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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
			Turbidity (former standard) NTU	50 (A&Ww)	0.76 - 61	1 of 23		Lab reporting limits for 22 other mercury samples too high to use results for assessment.
	USGS Monitoring Below Tapco Substation VRVER087.70 101552	1999 - 1 full suite	No exceedances					
	USGS Monitoring Above sewage pond VRVER086.92 101549	1999 - 1 full suite	No exceedances					
	USGS Monitoring At sewage pond VRVER086.81 101548	1999 - 1 full suite	No exceedances					
	USGS Monitoring Below diversion dam VRVER086.62 101550	1999 - 1 full suite	No exceedances					
	Phelps Dodge Permit Instream Monitoring Upstream of Tuzigoot seeps VRVER085.61	1998 - 3 partial suites 1999 - 4 partial suites 2000 - 4 partial suites 2001 - 4 partial suites 2002 - 4 partial suites	Lead (total) µg/L	15 (FBC)	<5 - 40	2 of 19		
	Phelps Dodge Permit Instream Monitoring Below Tuzigoot seeps VRVER085.60	1998 - 3 partial suites 1999 - 4 partial suites 2000 - 4 partial suites 2001 - 4 partial suites 2002 - 4 partial suites	No exceedances					
	USGS Monitoring At Tuzigoot Bridge VRVER085.49 101546	1999 - 1 full suite	No exceedances					
	USGS Monitoring Above Dead Horse State Park VRVER084.38 101544	1999 - 1 full suite	No exceedances					
	ADEQ Ambient and Biocriteria At Dead Horse State Park VRVER84.38 100482	1999 - 1 full suite	No exceedances					
	USGS Monitoring Below Dead Horse State Park VRVER084.42 101545	1999 - 1 full suite	No exceedances					



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STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row	1998 - 2002	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	0 - 240	1 of 25 events (in 2000)	Inconclusive	ADEQ, USGS, and Phelps Dodge collected a total of 89 samples at 11 sites in 1998-2002. Assessed as "attaining some uses" and placed on the Planning List due to mercury and <i>Escherichia coli</i> exceedances.
	A&Ww Inconclusive FC Attaining	89 samples 34 sampling events	Lead (total) µg/L	15 (FBC)	<5 - 40	2 of 63	Attaining	
	FBC Inconclusive Agl Attaining		Mercury (dissolved) µg/L	0.01 (A&Ww chronic)	<0.1 - 0.1	1 of 1 event (insufficient events)	Inconclusive	
	Agl Attaining		Turbidity (former standard) NTU	50 (A&Ww)	0.75 - 61	1 of 25	Attaining	
Verde River Oak Creek - Beaver Creek AZ15060202-015 A&Ww, FC, FBC, Agl, AgL	ADEQ TMDL Program Below Oak Creek VRVER078.8	1998 - 1 partial suite	No exceedances					
	ADEQ Biocriteria & TMDL At 1000 Trails VRVER078.76 100481	1999 - 1 partial suite	No exceedances					
	ADEQ Biocriteria & TMDL Program Across from Reservation VRVER075.14 100718	1999 - 1 partial suite	No exceedances					
	Summary Row	1998 - 1999	No exceedances					Insufficient monitoring data to assess (only 2 sampling events).  *A turbidity TMDL was approved by EPA in 2002. Reach will remain "not attaining" until turbidity or suspended sediment concentration (SSC) monitoring indicates designated uses are being attained.
	A&Ww Not attaining* FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive	3 samples 2 sampling events						
Verde River HUC border 15060203 - West Clear Creek AZ15060203-027 A&Ww, FC, FBC, Agl, AgL	ADEQ Biocriteria Program Above West Clear Creek VRVER066.74 100723	1999 - 1 partial suite	No exceedances					
	USGS Fixed Station #09505570 Above West Clear Creek VRVER066.64 100750	1998 - 5 full suites	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	60 - 240	1 of 5		
	Summary Row	1998 - 1999	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	60 - 240	1 of 5 events (in 1998, do not have 3 years sampling after)	Inconclusive	
	A&Ww Inconclusive FC Attaining FBC Inconclusive Agl Attaining Agl Attaining	6 sampling events						ADEQ and USGS collected 6 samples at 2 sites in 1998-1999. Assessed as "attaining some uses" and placed on the Planning List due to <i>Escherichia coli</i> exceedance and missing core parameters: dissolved metals (copper, cadmium, and zinc).



TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
Verde River West Clear Creek - Fossil Creek AZ15060203-025 A&Ww, FC, FBC, Agl, AgL	ADEQ TMDL Monitoring At Beasley Flat VRVER064.80 100677	1999 - 1 partial suite 2002 - 1 partial suite	Turbidity (former standard) NTU	50 (A&Ww)	77	1 of 1		Also exceeded SSC standard (SSC =133, standard is 80), but lacked minimum of 4 samples to calculate geometric mean.
	ADEQ Fixed Station At Beasley Flat VRVER064.68 100477	1998 - 1 full suite 1999 - 4 full suites 2000 - 3 full suites 2001 - 4 full suites 2002 - 4 full suites	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	<2 - 1,125	1 of 15		
			Selenium µg/L	2 (A&Ww chronic)	<5 - 5.4	1 of 1		Lab reporting limits for 15 other samples were too high to use results for assessment.
			Turbidity (former standard) NTU	50 (A&Ww)	<5 - 998	5 of 16		Only 1 SSC sample collected.
	Summary Row	1999 - 2000	<i>Escherichia coli</i> CFU/100 ml	235 (FBC)	<2 - 1,125	1 of 16 events (in 1998, 3 years sampling OK after)	Attaining	ADEQ and USGS collected 18 samples at 2 sites in 1999-2000.
	A&Ww FC FBC Agl Agl	Not attaining Attaining Attaining Attaining Attaining						
		18 samples	Selenium µg/L	2 (A&Ww chronic)	<5 - 5.4	1 of 1 event (insufficient events)	Inconclusive	A turbidity TMDL for reaches immediately upstream of this reach was approved by EPA in 2002. Assessed as "not attaining" because the turbidity loading on this reach will be addressed by the turbidity TMDL for the Verde River. Although current turbidity data are inconclusive, the reach will remain "not attaining" until turbidity or suspended sediment concentration (new sediment standard) data indicate designated uses are being attained.
			Turbidity (former standard) NTU	50 (A&Ww)	1 - 998	6 of 17	Inconclusive (Not attaining)	Also placed on the Planning List due to selenium exceedance.
Verde River Tangle Creek - later Flat AZ15060203-018 A&Ww, FC, FBC, Agl, AgL	Univ. of Az. Reservoir Project Above Horseshoe Reservoir VRVER036.88	2002 - 2 partial suites	Turbidity (former standard) NTU	50 (A&Ww)	4.7 - >1000	1 of 2		
	USGS Fixed Station #09508500 Below Tangle Creek VRVER036.48 100740	1998 - 5 full suites 1999 - 6 full suites 2000 - 4 full suites 2001 - 4 full suites 2002 - 4 full suites	<i>Escherichia coli</i> CFU/100 mg/L	235 (FBC)	<1.0 - 770	1 of 22		
			Turbidity (former standard) NTU	50 (A&Ww)	0.2 - 170	4 of 22		
	SRP Ambient Monitoring Above Horseshoe Reservoir VRVER032.74	1998 - 15 partial suites 1999 - 14 partial suites 2000 - 15 partial suites 2001 - 11 partial suites 2002 - 12 partial suites	Copper (dissolved) µg/L	varies by hardness (A&Ww chronic)	<10 - 30	1 of 58		



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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row	1998 - 2002	Copper (dissolved) µg/L	varies by hardness (A&Ww chronic)	<10 - 30	1 of 58 events	Attaining	University of Arizona, USGS, and SRP collected 92 samples at 3 sites in 1998-2002. Reach is assessed as "attaining some uses" and placed on the Planning List due to: 1. <i>Escherichia coli</i> exceedances. 2. Former turbidity standard exceedances. Monitoring will be scheduled to determine whether bottom deposit violations are occurring.
	A&Ww Inconclusive FC Attaining FBC Inconclusive Agl Attaining Agl Attaining	92 samples 85 sampling events	<i>Escherichia coli</i> CFU/100 mg/L	235 (FBC)	<1.0 - 770	1 of 24 events (in 2000)	Inconclusive	
			Turbidity (former standard) NTU	50 (A&Ww)	0.3 - 170	5 of 24	Inconclusive	
Verde River Horseshoe Dam - Alder Creek AZ15060203-008 A&Ww, FC, FBC, Agl, AgL	AGFD Ambient Monitoring Below Horseshoe Reservoir VRVER030.17	1999 - 1 partial suite	No exceedances					
	Univ. of Az. Reservoir Project Below Horseshoe Reservoir VRVER028.65	2002 - 2 partial suites	No exceedances					
	AGFD Ambient Monitoring Below Mesquite Rec. Area VRVER028.70	1999 - 1 partial suite	No exceedances					
	ADEQ Ambient Monitoring Below Horseshoe Reservoir VEVER027.54 100831	1999 - 1 full suite	No exceedances					
	Summary Row	1999 - 2002	No exceedances					ADEQ, AGFD, and University of Arizona collected 5 samples at 4 sites in 1999 - 2002. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> , total boron, dissolved metals (copper, cadmium, and zinc), and total mercury.
	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Attaining	5 sampling events						
Verde River Bartlett Dam - Camp Creek AZ15060203-004 A&Ww, FC, FBC, DWS, Agl, Agl	Univ. of Az. Reservoir Project Below Bartlett Lake VRVER018.51	2002 - 2 partial suites	No exceedances					
	USGS Fixed Station #09510000 Below Bartlett Dam VRVER018.13 100741	1999 - 4 full suites 2000 - 6 full suites 2001 - 5 full suites 2002 - 3 full suites	No exceedances					
	SRP Routine Monitoring Below Bartlett Dam VRVER017.55	1998 - 10 partial suites 1999 - 13 partial suites 2000 - 13 partial suites 2001 - 11 partial suites 2002 - 12 partial suites	Copper (dissolved) µg/L	varies by hardness (A&Ww chronic)	<10 - 55	4 of 57		
				varies by hardness (A&Ww acute)	<10 - 55	1 of 57		
			Selenium (dissolved) µg/L	2 (A&Ww total, chronic)	<5 - 13	4 of 4		Lab reporting limits for 56 other selenium samples were too high to use results for assessment.



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STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	Summary Row	1998 - 2002	Copper: (dissolved) µg/L	varies by hardness (A&Ww chronic)	<10 - 35	4 of 80 events	Impaired	University of Arizona, USGS, and SRP collected 79 samples at 3 sites in 1998 - 2002. Assessed as "impaired" due to copper and selenium exceedances.
	A&Ww Impaired FC Attaining FBC Attaining DWS Attaining Agl Attaining Agl Attaining	79 samples		varies by hardness (A&Ww acute)	< 10 - 55	1 of 80 events (in 1998, 3 years OK after)	Attaining	
			Selenium: (dissolved) µg/L	2 (A&Ww total, chronic)	<5 - 13	4 of 23 events	Impaired	
Verde River Camp Creek - Sycamore Creek 15060203-003 A&Ww, FBC, FC, DWS, Agl, Agl	USGS Fort McDowell Study Fort McDowell north boundary VRVER011.34 101522	1998 - 2 partial suites 1999 - 4 partial suites	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Attaining DWS Inconclusive Agl Inconclusive Agl Inconclusive	1998 - 1999 8 sampling events	No exceedances					USGS collected 8 samples in 1998-1999. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: dissolved cadmium and total metals (mercury, arsenic, chromium, lead, manganese, and copper).
Verde River Sycamore Creek - Salt River 15060203-001 A&Ww, FBC, FC, DWS, Agl, Agl	Univ. of AZ - Reservoir Project for ADEQ Above Salt River confluence VRVER003.18	2002 - 1 partial suite	No exceedances					AGFD and University of Arizona collected 3 samples in 1999-2002. Assessed as "inconclusive" and placed on the Planning List due to insufficient monitoring events for all core parameters (only 1 or 2 samples for each).
	AGFD Ambient Monitoring Above Salt River confluence VRVER000.18	1999 - 2 partial suites	No exceedances					
	Summary Row A&Ww Inconclusive FBC Inconclusive FC Inconclusive DWS Inconclusive Agl Inconclusive Agl Inconclusive	1998 - 2002 3 sampling events	No exceedances					
West Clear Creek Meadow Canyon - Verde River AZ15060203-026B A&Ww, FC, FBC, Agl, Agl	ADEQ Biocriteria Program Above Bull Pen Ranch VRWCL006.09 100204	1998 - 1 partial suite 1999 - 1 partial suite	No exceedances					
	USGS Fixed Station #09505800 Near Camp Verde VRWCL005.79 100749	1998 - 12 partial suites 1999 - 12 partial suites 2000 - 3 partial suites 2001 - 9 partial suites 2002 - 6 partial suites	No exceedances					
	ADEQ Biocriteria Program At campground VRWCL002.91 100689	1999 - 1 partial suite	No exceedances					



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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	Summary Row	1998-2002	No exceedances					ADEQ and USGS collected 45 samples at 3 sites in 1998-2002. Assessed as "Inconclusive" and placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> , dissolved zinc, total boron, and total metals (mercury, manganese, copper, and lead).
	A&Ww Inconclusive	45 samples						
	FC Inconclusive							
	FBC Inconclusive							
	AgI Inconclusive							
Wet Beaver Creek Long Canyon - Rarick Canyon AZ15060202-004 A&Ww, FC, FBC, AgI, AgL	ADEQ Biocriteria & TMDL Above USGS gage at Rimrock VRWBV006.79 100497	1998 - 1 partial suite 1999 - 4 partial suites	No exceedances					
	ADEQ Biocriteria Program At campground VRWBV005.06 100684	1999 - 1 partial suite	No exceedances					
	ADEQ TMDL Program At camp ground VRBEV004.95	1999 - 5 partial suites	No exceedances					
	ADEQ TMDL Program At Montezuma Well VRWBV003.18	1999 - 4 partial suites	No exceedances					
	Summary Row	1998 - 2002	No exceedances					
	A&Ww Inconclusive	15 samples						ADEQ collected 15 samples at 4 sites in 1998-2002. Assessed as "Inconclusive" and placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> , total boron, dissolved metals (copper and zinc), and total metals (mercury, manganese, copper, and lead).
	FC Inconclusive	7 sampling events						
	FBC Inconclusive							
	AgI Inconclusive							
	AgL Inconclusive							
Wet Beaver Creek Rarick Canyon - Dry Beaver Creek AZ15060202-003 A&Ww, FC, FBC, AgI, AgL	USGS Ambient Monitoring VRWBV003.18 101543	2002 - 1 partial suite	No exceedances					
	Summary Row	2002	No exceedances					Insufficient monitoring data to assess.
	A&Ww Inconclusive	1 sampling event						
	FC Inconclusive							
	FBC Inconclusive							
	AgI Inconclusive							
	AgL Inconclusive							
<b>LAKE MONITORING DATA</b>								
Bartlett Lake AZL15080203-0110 A&Ww, FC, FBC, DWS, AgI, AgL	ADEQ Lakes Program VRBAR-A (deepest) 100009	1998 - 3 partial suites 1999 - 3 partial suites 2000 - 2 partial suites 2001 - 1 full + 1 partial suites 2002 - 1 full suite	No exceedances					All 4 <i>Escherichia coli</i> samples were collected by ADEQ on the same date (one event).
	ADEQ Lakes Program VRBAR-B (mid lake) 100010	1998 - 3 full suites 1999 - 3 full suites 2000 - 1 partial suites 2001 - 2 full suites 2002 - 1 full suite	No exceedances					



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			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	ADEQ Lakes Program VRBAR-C 100011	1998 - 3 full suites 1999 - 3 full suites 2000 - 1 partial suites 2001 - 2 full suites 2002 - 1 full suite	Turbidity (former standard) NTU	25 (A&Ww)	3 - 28	1 of 7		The turbidity exceedance at site C was due to an upstream dam release and natural mixing flows in this area of the lake; therefore, the turbidity was not included in the final assessment.
	ADEQ Lakes Program VRBAR-NTU1 thru NTU5 100980	1999 - Turbidity + field at 5 sites 2000 - Turbidity + field at 5 sites	No exceedances					
	ADEQ Lakes Program VRBAR - MAR1 (marina) 100986	2001 - 1 field, MTBE 2002 - 1 MTBE	No exceedances					
	ADEQ Lakes Program VRBAR - SW (swim area) 101321	2002 - 1 <i>Escherichia coli</i>	No exceedances					
	AGFD Ambient Monitoring VRBAR - DAM SITE	2000 - 1 partial suite	No exceedances					
	AGFD Ambient Monitoring VRBAR - MID LAKE	2000 - 1 partial suite	No exceedances					
	AGFD Ambient Monitoring VRBAR - BARTLETT FLATS	2000 - 1 partial suite	No exceedances					
	Univ. of Az. Reservoir Project Bartlett Lake VRBAR - A	1999 - 4 partial suites 2000 - 8 partial suites 2002 - 2 full suites	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, Agl)	7.7 - 9.3	1 of 14		
	Summary Row A&Ww Inconclusive FC Attaining FBC Inconclusive DWB Attaining Agl Attaining Agl Attaining	1998 - 2002 61 samples 31 sampling events	pH (SU)	6.5 - 9.0 (A&Ww, FBC, Agl, Agl)	7.7 - 9.3	1 of 60	Attaining	ADEQ, AGFD, and University of Arizona collected 61 samples at 14 sites in 1998-2002. Assessed as "attaining some uses" and placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> and dissolved metals (copper, cadmium, and zinc).
Fountain Lake AZL15060203-0003 A&Ww, FBC, FC (tributary rule)	USGS Special Investigation In Fountain Hills, Arizona VRFHL 101597	1998 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FBC Inconclusive FC Inconclusive	1998 1 sampling event	No exceedances					Insufficient monitoring data to assess.
Granite Basin Lake AZL15060202-0580 A&Ww, FC, FBC, Agl, Agl	ADEQ Lakes Program VRGBL - A (deepest), VRGBL-B (mid-lake), VRGBL-BR (boat ramp) 100024, 100025, 101398 (sites combined for assessment because they were not spatially independent)	1999 - 3 full + 1 partial suite 2002 - 3 partial suites	Ammonia mg/L	varies by temperature and pH (A&Ww chronic)	0.03 - 7.65	1 of 6		Lab reporting limits for dissolved metals were too high to use results for assessment.  Dissolved oxygen violations were determined to be natural due to lake turnover. Not included in final assessment.
			Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	3.6 - 11.2 (39%-142%)	2 of 6		
			pH (low) SU	6.5 - 9.0 (A&Ww, FBC, Agl, Agl)	7.0 - 9.7	2 of 6		
	Summary Row A&Ww Inconclusive FC Attaining FBC Inconclusive Agl Inconclusive Agl Inconclusive	1998-2002 12 samples 8 sampling events	Ammonia mg/L	varies by hardness (A&Ww chronic)	0.03 - 7.65	1 of 6 events	Inconclusive	ADEQ collected 12 samples at 3 sites in 1998-2002. Assessed as "attaining some uses" and placed on the Planning List due to high pH, ammonia exceedance, and missing core parameters: <i>Escherichia coli</i> and dissolved metals (copper, cadmium, and zinc).



TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
			pH (high) SU	6.5 - 9.0 (A&Ww, FBC, Agl, AgL)	7.0 - 9.5	2 of 6	Inconclusive	
Horseshoe Reservoir AZL15060203-0620 A&Ww, FC, FBC, Agl, AgL	Univ. of Az. Reservoir Project VRHSR - A (deepest)	1999 - 4 partial suites 2000 - 4 partial suites	Turbidity (former standard) NTU	25 (A&Ww)	2 - 90	3 of 8		
	Univ. of Az. Reservoir Project VRHSR - B (mid lake)	1999 - 4 partial suites 2000 - 3 partial suites	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, AgL)	8.2 - 9.3	1 of 7		
			Turbidity (former standard) NTU	25 (A&Ww)	0.8 - 32	1 of 7		
	Univ. of Az. Reservoir Project VRHSR - C	1999 - 2 partial suites 2000 - 1 partial suite	No exceedances					
	AGFD Ambient Monitoring VRHSR - East Spill Tower	1999 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive	1999 - 2000 19 samples 9 sampling events	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, AgL)	8.2 - 9.3	1 of 19	Attaining	University of Arizona and AGFD collected 19 samples at 4 sites in 1999 - 2000. Assessed as "inconclusive" and placed on the Planning List due to missing core parameters and exceedances of the former turbidity standard. Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed.
			Turbidity (former standard) NTU	25 (A&Ww)	0.8 - 90	4 of 18	Inconclusive (see comment)	Missing core parameters: <i>Escherichia coli</i> , total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, manganese, copper, and lead).
J D Dam Lake AZL15060202-0700 A&Ww, FBC, FC, Agl, AgL	ADEQ Lakes Program VRJDD - A (deepest) 101286	2001 - 4 partial suites	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, AgL)	6.2 - 8.9	1 of 4		Used worst case pH of 1 of 10 samples taken. Algal bloom noted at the time.
	ADEQ Lakes Program VRJDD - BR (boat ramp) 101318	2002 - 1 <i>Escherichia coli</i>	No exceedances					
	AGFD Ambient Monitoring VRJDD - M (mid lake)	2001 - 1 partial suite	No exceedances					
	Summary Row A&Ww Inconclusive FC Attaining FBC Inconclusive Agl Attaining AgL Attaining	2001 - 2002 6 sampling events	pH SU	6.5 - 9.0 (A&Ww, FBC)	6.2 - 8.9	1 of 5	Inconclusive	ADEQ and AGFD collected 6 samples in 2001 - 2002. Assessed as "attaining some uses" and placed on the Planning List due to low pH and missing core parameters: <i>Escherichia coli</i> and dissolved metals (copper and cadmium).
Pecks Lake AZL15060202-1060 A&Ww, FC, FBC, Agl, AgL	ADEQ Lakes Program VRPEC-A 100063	1999 - 4 partial suites 2002 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Ww)	5.0 - 11.7	1 of 5		
	ADEQ Lakes Program VRPEC-AA 100511	1999 - 1 partial suite 2000 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Ww)	2.0 - 8.3 (18 - 85%)	1 of 2		
	ADEQ Lakes Program VRPEC-F 1005113	1999 - 2 partial suites 2002 - 1 partial suite	No exceedances					



TABLE 23. VERDE WATERSHED – 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	COMMENTS
	Summary Row A&Wc Not attaining FC Attaining FBC Inconclusive Agl Attaining Agl Attaining	1999 - 2002 11 samples 6 sampling events	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	2 - 11.7 (18 - 85%)	2 of 7	Inconclusive (Not attaining)	ADEQ collected 11 samples at 3 sites in 1999-2002.  A nutrient TMDL to address dissolved oxygen and pH problems was approved by EPA in 2000. Although current dissolved oxygen data are inconclusive, lake is assessed as "not attaining" until dissolved oxygen data indicate designated uses are being attained.  Placed on the Planning List for TMDL follow-up monitoring and missing core parameters: <i>Escherichia coli</i> , turbidity, and dissolved metals (cadmium, copper, and zinc).
Perkins Tank AZL15060202-1080 A&Wc, FC, FBC, AgL	ADEQ Lakes Program VRPER-A (deepest) 101296	2001 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.2 - 6.8 (68 - 74%)	1 of 1		
			Turbidity (former standard) NTU	10 (A&Wc)	3 - 13	1 of 1		
	AGFD Lakes Program VRPER-MID (mid lake)	2001 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	4.6 (60%)	1 of 1		
	Summary Row A&Wc Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive	2001 2 sampling events	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	4.6 - 6.6 (65 - 106%)	2 of 2	Inconclusive	Insufficient monitoring data to assess.  Placed on the Planning List due to low dissolved oxygen and exceedance of the former turbidity standard. Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed.
Scholze Lake AZL15060202-1350 A&Ww, FC, FBC, AgL	ADEQ Lakes Program VRSch-A (deepest) VRSch 101295	2001 - 3 partial suites 2002 - 1 full suite	Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	4.8 - 7.7 (44 - 81%)	1 of 3		
			Lead (dissolved) µg/L	varies by hardness (A&Ww chronic)	4	1 of 1		
			Total nitrogen mg/L	3.0 (A&Ww)	2.47 - 3.36	2 of 4		
			Turbidity (former standard) NTU	25 (A&Ww)	8 - 78	1 of 3		
	Summary Row A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive	2001 - 2002 4 sampling events	Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	4.8 - 7.7 (44 - 81%)	1 of 3	Inconclusive	ADEQ collected 4 samples in 2001-2002. Assessed as "inconclusive" and placed on the Planning List due to low dissolved oxygen and exceedances of lead, nitrogen, and the former turbidity standard. Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed.  Also placed on the Planning List due to missing core parameters: <i>Escherichia coli</i> , dissolved metals (copper and cadmium), and total metals (mercury, copper, and lead).
			Lead (dissolved) µg/L	varies by hardness (A&Ww chronic)	4	1 of 1 event (insufficient events)	Inconclusive	
			Total nitrogen mg/L	3.0 (A&Ww)	2.47 - 3.36	2 of 4	Inconclusive	
			Turbidity (former standard) NTU	25 (A&Ww)	8 - 78	1 of 3	Inconclusive (see comment)	



**TABLE 23. VERDE WATERSHED – 2004 ASSESSMENT MONITORING DATA**

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
Stoneman Lake AZL15060202-1490 A&Wc, FC, FBC, Agl, AgL	ADEQ Lakes Program VRSTN-A (deepest) 100086	1999 - 5 partial suites 2001 - 1 partial suite	pH SU	6.5-9.0 (A&Wc, FBC, Agl, AgL)	8.7 - 9.9	2 of 4		
	ADEQ Lakes Program VRSTN-B (mid lake) 100698	1999 - 4 partial suites 2001 - 1 partial suite	Arsenic (total) µg/L	50 (FBC)	28 - 107	1 of 4		
			Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.7 - 14.5 (82 - 83%)	1 of 3		
			pH SU	6.5 - 9.0 (A&Wc, FBC, Agl, AgL)	8.8 - 9.8	2 of 5		
	ADEQ Lakes Program Central portion of backwaters VRSTN-MIDBW	1999 - 1 partial suite	No exceedances					
	ADEQ Lakes Program East portion, next to dike VRSTN - 1	1999 - 1 partial suite	pH SU	6.5 - 9.0 (A&Wc, FBC, Agl, AgL)	9.6	1 of 1		
	ADEQ Lakes Program North east bank of the dike VRSTN - 1E	1999 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	6.1 (65%)	1 of 1		Dissolved oxygen samples taken in backwater and back of dike are not representative of lake conditions. Low dissolved oxygen is due to natural ground water recharge. Not included in final assessment.
	ADEQ Lakes Program Northeast portion of backwater VRSTN - 1EE	1999 - 1 partial suite	Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	4.2 (47%)	1 of 1		
	ADEQ Lakes Program Central portion of north backwater VRSTN - 1S	1999 - 1 partial suite	pH SU	6.5 - 9.0 (A&Wc, FBC, Agl, AgL)	9.5	1 of 1		
	AGFD Lakes Monitoring VRSTN - MID (mid lake)	2001 - 1 partial suite	Arsenic µg/L	50 (FBC)	70.6	1 of 1		
	Summary Row  A&Wc Not attaining FC Attaining FBC Not attaining Agl Not attaining Agl Not attaining	1999 - 2001  17 samples 7 sampling events	Arsenic µg/L	50 FBC	28 - 107	2 of 8	Inconclusive	ADEQ and AGFD collected 17 samples at 8 sites in 1999-2002.  A nutrient TMDL to address low dissolved oxygen and high pH was approved by EPA in 2000. Assessed as "not attaining" due to pH exceedances. Although current pH data are inconclusive, this lake will remain "not attaining" until pH data indicate designated uses are being attained.
			Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	4.2 - 14.5 (47 - 106%)	1 of 12	Attaining	Placed on the Planning List for arsenic exceedances, missing core parameter ( <i>Escherichia coli</i> ), and TMDL follow-up monitoring.
			pH SU	6.5 - 9.0 (A&Wc, FBC, Agl, AgL)	8.1 - 9.9	6 of 10	Inconclusive (Not attaining)	Note that ADEQ is investigating establishing site-specific standards on this lake.  Lake was completely dry in 2002.
Watson Lake AZL15060202-1590 A&Ww, FC, FBC, Agl, AgL	ADEQ Lakes Program VRWAT-A (deepest) 101353	2002 - 1 full + 1 partial suite	Dissolved oxygen mg/L	> 6.0 (90% saturation) (A&Ww)	5.6 - 8.5 (64 - 85%)	1 of 2		
			Total nitrogen mg/L	3.0 (A&Ww)	1.24 - 4.85	1 of 2		



TABLE 23. VERDE WATERSHED – 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
	ADEQ Lakes Program VRWAT - BR (boat ramp) 101397	2002 - 1 <i>Escherichia coli</i>	No exceedances					Field notes indicate that the lake was full of algae. Golden shiner fish kill in 2000.
	AGFD Ambient Monitoring VRWAT - BR (boat ramp)	2001 - 1 pH	No exceedances					
	AGFD Fish kill investigation VRWAT-DAM (dam site)	2000 - 1 partial suite	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, AgL)	9.8	1 of 1		
			Total nitrogen mg/L	3.0 (A&Ww)	4	1 of 1		
	AGFD Fish kill investigation VRWAT - SO (south end)	2000 - 1 partial suite	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, AgL)	9.5	1 of 1		
	Summary Row	2000 - 2002	Dissolved oxygen mg/L	> 6.0 90% saturation (A&Ww)	5.6 - 9.1 (64 - 85%)	1 of 5	Inconclusive	ADEQ and AGFD collected 6 samples at 6 sites in 2000 - 2002. Assessed as "Inconclusive" and placed on the Planning List due to dissolved oxygen, nitrogen and pH exceedances, missing core parameters, and a fish kill in 2000.
	A&Ww Inconclusive FBC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive	6 samples 4 sampling events	pH SU	6.5 - 9.0 (A&Ww, FBC, Agl, AgL)	7.5 - 9.8	2 of 5	Inconclusive	
			Total nitrogen mg/L	3.0 (A&Ww)	0.89 - 4.85	2 of 5	Inconclusive	



TABLE 23. VERDE WATERSHED -- 2004 ASSESSMENT MONITORING DATA

STREAM NAME SEGMENT WATERBODY ID DESIGNATED USES	AGENCY AND PROGRAM SITE DESCRIPTION SITE CODE ADEQ DATABASE ID	YEAR SAMPLED NUMBER AND TYPE OF SAMPLES	EXCEEDANCES OF STANDARDS BY SITE					COMMENTS
			PARAMETER UNITS	STANDARD (DESIGNATED USE)	RANGE OF RESULTS	FREQUENCY EXCEEDED	DESIGNATED USE SUPPORT	
Whitehorse Lake AZL15060202-1630 A&Wc, FC, FBC, DWS, Agl, Agl	ADEQ Lakes Program VRWHH - A 100090	1999 - 3 full suites 2000 - 3 full suites 2001 - 6 full suites 2002 - 1 full suite	Ammonia mg/L	varies by hardness (A&Wc chronic)	0.11 - 1.24	1 of 11		Fish kill reported in 1999.  Lab reporting limits for some dissolved metals samples were too high to assess standards.
			Dissolved oxygen mg/L	> 7.0 90% saturation (A&Wc)	0.6 - 10.4 (7-145%)	3 of 11		
			Nickel (total)	140 (DWS)	<10 - 210	1 of 11		
			pH SU	8.5 - 9.0 (A&Wc, FBC, Agl) 4.5 - 9.0 (Agl) 5.0 - 9.0 (DWS)	6.2 - 9.6	1 of 13 too high 1 of 13 too low		
			Turbidity (former standard) NTU	10 (A&Wc)	21 - 46	9 of 9		
	ADEQ Lakes Program VRWHH-B 100724	1999 - 3 full suites	Ammonia mg/L	varies by hardness (A&Wc chronic)	0.08 - 0.42	1 of 2		
			Dissolved oxygen mg/L	> 7.0 90% saturation (A&Wc)	5.8 - 10.0 (73-148%)	1 of 3		
			pH SU	6.5 - 9.0 (A&Wc, FBC, Agl) 4.5 - 9.0 (Agl) 5.0 - 9.0 (DWS)	7.1 - 9.6	1 of 3		
	ADEQ Lakes Program VRWHH - BR (boat ramp) 101317	2002 - 1 <i>Escherichia coli</i>	No exceedances					
	Summary Row  A&Wc    Impaired* FC       Inconclusive FBC      Inconclusive DWS      Attaining Agl       Attaining Agl       Attaining	1999-2002  17 samples 13 sampling events	Ammonia mg/L	varies by temperature and pH (A&Wc chronic)	0.08 - 1.24	2 of 13 events (15% events)	Inconclusive	ADEQ collected 17 samples at 3 sites from 1999-2002.  *EPA placed this lake on the 2002 303(d) List for dissolved oxygen based on 5 exceedances in 11 samples. Although Arizona's Impaired Water Identification Rule requires a minimum of 20 samples to base a listing decision for dissolved oxygen, the lake cannot be delisted until a TMDL is complete or dissolved oxygen data indicate designated uses are being attained. Therefore, the lake is assessed as "Impaired."  Placed on the Planning List due to: 1. Ammonia exceedances. 2. A fish kill in 1998 that may be evidence of a narrative standard violation. 3. Missing core parameters: <i>Escherichia coli</i> and dissolved metals (copper, cadmium, and zinc). 4. Exceedances of the former turbidity standard. Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed.
			Dissolved oxygen mg/L	> 7.0 (90% saturation) (A&Wc)	5.75-8.96 (73-148%)	4 of 14	Inconclusive (Impaired)	
			Nickel (total)	140 (DWS)	<10 - 210	1 of 11	Attaining	
			pH SU	6.5 - 9.0 (A&Wc, FBC, Agl) 4.5 - 9.0 (Agl) 5.0 - 9.0 (DWS)	6.2 - 9.6	2 of 16 high 1 of 16 low	Attaining	
			Turbidity (former standard) NTU	10 (A&Wc)	21 - 46	9 of 9	Inconclusive	

**TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
<b>VERDE WATERSHED -- STREAM ASSESSMENTS</b>				
Apache Creek headwaters - Walnut Creek 8 miles AZ15060201-019	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 -- Inconclusive	On the Planning List (no current monitoring data). Added in 2002 due to missing core parameters.		
Beaver Creek Dry Beaver Creek - Verde River 9 miles AZ15060202-002	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 -- Inconclusive	On the Planning List due to: 1. Former <u>turbidity</u> standard exceedances (5 of 26 samples). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring. 2. <u>Missing core parameters</u> : <i>Escherichia coli</i> , dissolved metals (cadmium, copper, and zinc), and total metals (mercury, copper, and lead).	<u>Delist turbidity</u> . Standard repealed in 2002. The Aquatic and Wildlife use is assessed as "inconclusive" and placed on the Planning List due to exceedances of the former turbidity standard (5 of 26 samples exceed).	EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
Bitter Creek Jerome WWTP - 2.5 miles below 3 miles AZ15060202-066B	A&Wedw Inconclusive PBC Inconclusive AgL Inconclusive Category 3 -- Inconclusive	On the Planning List (no current monitoring data). Added in 2002 due to insufficient monitoring data.		
Bitter Creek, <u>unnamed tributary of</u> headwaters - Bitter Creek 7 miles AZ15060202-868	A&Ww Inconclusive FBC Inconclusive FC Inconclusive Category 3 -- Inconclusive	On the Planning List (no current monitoring data). Added in 2002 due to past exceedances of <u>cadmium, copper, pH, and zinc</u> standards.		
Camp Creek headwaters - Verde River 19 miles AZ15060203-031	A&Ww Inconclusive FBC Inconclusive FC Inconclusive AgL Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample)		
Colony Wash headwaters - Fort McDowell Indian Reservation 3 miles AZ15060203-998	A&We Inconclusive PBC Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
East Verde River headwaters - Ellison Creek 8 miles AZ15060203-022A (Reach was split into coldwater and warmwater segments since the last assessment.)	A&Wc Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive AgL Inconclusive Category 3 -- Inconclusive	On the Planning List due to: 1. Insufficient monitoring events to assess (only 2 sampling events). 2. Former <u>turbidity</u> standard exceedances (2 of 2 samples). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring.		
East Verde River Ellison Creek - American Gulch 20 miles AZ15060203-022B (Reach was split into coldwater and warmwater segments since the last assessment.)	A&Ww Impaired FC Attaining FBC Attaining DWS Attaining AgL Attaining Category 5 -- Impaired		Add <u>selenium</u> to the 2004 303(d) List due to chronic exceedances in 2 of 2 samples.	



**TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
East Verde River American Gulch - Verde River 25 miles AZ15060203-022C (Reach renamed as "C" because of split discussed above.)	A&Ww    Attaining FC        Attaining FBC       Attaining DWS       Inconclusive Agl        Attaining AglL       Attaining Category 2 -- Attaining Some Uses	On the Planning List due to <u>boron</u> exceedances (4 of 20 samples).  ADEQ is considering a Use Attainability Analysis for Domestic Water Source due to high levels of naturally occurring <u>arsenic</u> (7 of 23 samples exceeded standards).		
Ellison Creek headwaters - East Verde River 11 miles AZ15060203-459	A&Ww    Inconclusive FC        Inconclusive FBC       Inconclusive AglL       Inconclusive Category 3 -- Inconclusive	On the Planning List (no current monitoring data). Added in 2002 due to insufficient sampling events and missing core parameters.		
Fossil Creek headwaters - Verde River 20 miles AZ15060203-024	A&Ww    Inconclusive FC        Inconclusive FBC       Inconclusive AglL       Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 2 samples).		
Grande Wash headwaters - Ashbrook Wash 6 miles AZ15060203-991	A&Ww    Inconclusive FBC       Not attaining FC        Inconclusive Category 4B-- Not attaining	On the Planning List for follow-up <u>Escherichia coli</u> monitoring (standard exceeded in 2 of 2 sampling events). Fountain Hills WWTP has now changed disposal method to recharge, thereby eliminating discharges to this wash. <u>E. coli</u> levels are expected to meet water quality standards for the next assessment.  Also on the Planning List due to <u>missing core</u> <u>parameters</u> : dissolved cadmium, dissolved oxygen, turbidity/SSC, total mercury.		
Granite Creek headwaters - Willow Creek 13 miles AZ15060202-059A (Reach was split into coldwater and warmwater segments since the last assessment. No current data in 059B.)	A&Wc    Inconclusive FC        Inconclusive FBC       Inconclusive Agl        Inconclusive AglL       Inconclusive Category 3 -- Inconclusive	On the Planning List due to: 1. <u>Escherichia coli</u> exceedances (2 of 4 sampling events for single sample maximum in 2000, 1 overall geometric mean exceedance). 2. Low <u>dissolved oxygen</u> (4 of 6 samples). 3. <u>Chronic mercury</u> exceedances (1 of 2 sampling events). 4. No current turbidity data; however, added to the Planning List in 2002 due to exceedances of the former turbidity standard in 1 of 2 samples. Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring. 5. <u>Missing core parameters</u> : turbidity/SSC, dissolved metals (cadmium and copper), and total metals (mercury, manganese, copper, and lead).		ADEQ anticipates that EPA will use the same criteria and place this reach on the 2004 303(d) List for dissolved oxygen (low diss. oxygen in 4 of 6 samples). For the 2002 303(d) List, EPA determined that 3 or more exceedances with less than 10 samples were sufficient to list a water as "impaired," although Arizona's Impaired Water Identification Rule would require a minimum of 5 exceedances in 20 samples.
Munds Creek headwaters - Oak Creek 17 miles AZ15060202-415	A&Ww    Inconclusive FC        Inconclusive FBC       Inconclusive Category 3 -- Inconclusive	On the to the Planning List due to: 1. <u>Missing core parameters</u> : dissolved metals (copper, cadmium, and zinc) and total mercury. 2. <u>Insufficient seasonal representation</u> .		
Oak Creek headwaters - West Fork Oak Creek 7 miles AZ15060202-019 Unique Waters	A&Wc    Inconclusive FC        Inconclusive FBC       Inconclusive DWS       Inconclusive Agl        Inconclusive AglL       Inconclusive Category 3 -- Inconclusive	On the Planning List due to 1. Former <u>turbidity</u> standard exceedances (2 of 8 samples). Monitoring will be scheduled to determine whether suspended sediment or bottom deposit violations are occurring. 2. <u>Missing core parameters</u> : total fluoride, total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, arsenic, chromium, lead, manganese, and copper).		

**TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Oak Creek At Slide Rock State Park 1 mile AZ15060202-018B Unique Water (Reach was renumbered since last assessment - previously 018A.)	A&Ww Inconclusive FC Inconclusive FBC Not attaining DWS Inconclusive Agl Inconclusive Agl Inconclusive Category 4A -- Not Attaining	On the Planning List for: 1. <u>TMDL follow-up monitoring</u> for <i>Escherichia coli</i> exceedances (269 of 3408). 2. <u>Missing core parameters</u> : total fluoride, total boron, dissolved metals (copper, cadmium, and zinc), and total metals (mercury, arsenic, chromium, lead, manganese, and copper). 3. <u>Swimming closures</u> every summer due to high bacteria counts.		<i>Escherichia coli</i> TMDL was approved by EPA in 1999. Placed on the Planning List in 2002 for TMDL follow-up monitoring.  Currently initiating monitoring in support of a Phase II TMDL.  Slide Rock has had intermittent swimming closures due to high bacteria counts every summer during this 5-year assessment period (1998-2002). This may also be evidence of narrative standards violations.
Oak Creek Below Slide Rock State Park - Dry Creek 20 miles AZ15060202-018C Unique Water (Reach was split into coldwater and warmwater segments since the last assessment. No current data in 018A.)	A&Ww Attaining FC Attaining FBC Attaining DWS Attaining Agl Attaining Agl Attaining Category 1 -- Attaining All Uses		<u>Delist turbidity</u> . Reach is now attaining its uses based on the former standard. Designated uses changed from A&Wc to A&Ww because the reach is below 5000-foot elevation; therefore the former turbidity standard was raised from 10 to 50 NTU. New and older turbidity data do not exceed 50 NTU.	
Oak Creek Dry Creek - Spring Creek 10 miles AZ15060202-017 Unique Water	A&Ww Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive Agl Inconclusive Agl Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 2 samples).  <u>Remove turbidity</u> from the Planning List. Designated uses changed from A&Wc to A&Ww because the reach is below 5000-foot elevation, raising the former turbidity standard from 10 to 50 NTU. New and older data do not exceed the 50 NTU.		
Oak Creek Spring Creek - Verde River 13 miles AZ15060202-016 Unique Water	A&Ww Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive Agl Inconclusive Agl Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 2 samples).  <u>Remove turbidity</u> from the Planning List. Designated uses changed from A&Wc to A&Ww because the reach is below 5000-foot elevation, raising the former turbidity standard from 10 to 50 NTU. New and older data do not exceed the 50 NTU.		
Oak Creek, West Fork headwaters - Oak Creek 16 miles AZ15060202-020 Unique Water	A&Wc Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Pine Creek headwaters - unnamed tributary at 34°15'11"N/111°26'46"W 8 miles AZ15060203-049A (Reach was split into coldwater and warmwater segments since the last assessment.)	A&Wc Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive Agl Inconclusive Agl Inconclusive Category 3 -- Inconclusive	On the Planning List (no current monitoring data). Added in 2002 due to insufficient monitoring data.		



**TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

<b>SURFACE WATER DESCRIPTION</b>	<b>2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS</b>	<b>2004 PLANNING LIST</b>	<b>STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST</b>	<b>OTHER INFORMATION</b>
Pine Creek unnamed tributary at 34 21°51'111 26'46 - East Verde River 12 miles AZ15060203-049B (Reach was split into coldwater and warmwater segments since the last assessment.)	A&Ww Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive Agl Inconclusive AgL Inconclusive Category 3 -- Inconclusive	On the Planning List (no current monitoring data). Added in 2002 due to insufficient monitoring data.		
Pumphouse Wash headwaters - Oak Creek 8 miles AZ15060202-442	A&Wc Inconclusive FC Inconclusive FBC Attaining Category 2 -- Attaining Some Uses	On the Planning List due to missing core parameters: total mercury and dissolved metals (copper, cadmium, and zinc).		
Roundtree Canyon Creek headwaters - Tangle Creek 11 miles AZ15060203-853 (previously listed as Roundtree Creek)	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Spring Creek Coffee Creek - Oak Creek 7 miles AZ15060202-022	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive Category 3 -- Inconclusive (not assessed)	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Sycamore Creek Cedar Creek - Verde River 6 miles AZ15060202-026	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive Category 3 -- Inconclusive	On the Planning List due to Insufficient monitoring data to assess (only 1 sample). Added in 2002 due to missing core parameter.		
Sycamore Creek headwaters - Verde River 13 miles AZ15060203-055	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Verde River Granite Creek - Hell Canyon 16 miles AZ15060202-052	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Verde River Hell Canyon - unnamed reach 15060202-065 6 miles AZ15060202-038	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive Category 3 -- Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		

**TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Verde River unnamed reach 15060202-065 - Railroad Draw 11 miles AZ15060202-037	A&Ww    Attaining FC        Attaining FBC       Attaining Agl       Attaining Agl       Attaining Category 1 – Attaining All Uses	Remove <u>turbidity</u> from the Planning List. Current turbidity data indicate designated uses are being attained (3 exceedances in 17 samples).		Turbidity TMDL approved by EPA in 2002. Added to the Planning List in 2002 for TMDL follow-up monitoring.
Verde River Sycamore Creek - Oak Creek 25 miles AZ15060202-025	A&Ww    Inconclusive FC        Attaining FBC       Inconclusive Agl       Attaining Agl       Attaining Category 2 – Attaining Some Uses	On the Planning List due to: 1. <u>Chronic mercury</u> exceedance (1 of 1 sampling event). 2. <u>Escherichia coli</u> exceedance (1 of 25 sampling events, occurred in 2000).  Remove <u>turbidity</u> from the Planning List. Current turbidity data indicate designated uses are being attained (3 exceedances in 17 samples).		Turbidity TMDL approved by EPA in 2002. Added to the Planning List in 2002 for TMDL follow-up monitoring.
Verde River Oak Creek - Beaver Creek 13 miles AZ15060202-015	A&Ww    Not attaining FC        Inconclusive FBC       Inconclusive Agl       Inconclusive Agl       Inconclusive Category 4A – Not attaining	On the Planning List due to: 1. Insufficient monitoring data to assess (only 2 monitoring events). 2. <u>Turbidity</u> TMDL follow-up monitoring.		Turbidity TMDL approved by EPA in 2002. Added to the Planning List in 2002 for TMDL follow-up monitoring.
Verde River Beaver Creek - HUC boundary 15060203 0.5 miles AZ15060202-001	A&Ww    Not attaining FC        Inconclusive FBC       Inconclusive Agl       Inconclusive Agl       Inconclusive Category 4A – Not attaining	On the Planning List for: 1. Insufficient monitoring data (no current monitoring data). 2. Added in 2002 for <u>turbidity</u> TMDL follow-up monitoring.		Turbidity TMDL approved by EPA in 2002. Added to the Planning List in 2002 for TMDL follow-up monitoring.
Verde River HUC boundary 15060203 - West Clear Creek 6 miles AZ15060203-027	A&Ww    Inconclusive FC        Attaining FBC       Inconclusive Agl       Attaining Agl       Attaining Category 2 – Attaining Some Uses	On the Planning List due to: 1. <u>Escherichia coli</u> exceedance in 1 of 5 sampling events. Exceedance occurred in 1998, do not have 3 years of sampling after. 2. <u>Missing core parameters</u> : dissolved metals (copper, cadmium, and zinc).		<u>Turbidity</u> TMDL approved by EPA in 2002.  Not added to the Planning List in 2002 because turbidity was attaining uses (no exceedances in 6 samples).
Verde River West Clear Creek - Fossil Creek 24 miles AZ15060203-025	A&Ww    Not attaining FC        Attaining FBC       Attaining Agl       Attaining Agl       Attaining Category 4A – Not attaining	On the Planning List for: 1. TMDL follow-up monitoring for <u>turbidity</u> exceedances (6 of 17 samples). 2. <u>Chronic selenium</u> exceedance (1 of 1 sampling event).		Turbidity TMDL for adjacent reaches (AZ15060202-037 through AZ15060202-027) approved by EPA in 2002. Turbidity loadings for this reach are expected to be addressed through implementation of the TMDL. Therefore, assessed as "not attaining" and added to the Planning List for TMDL follow-up monitoring.
Verde River Tangle Creek - Ister Flat 4 miles AZ15060203-018	A&Ww    Inconclusive FC        Attaining FBC       Inconclusive Agl       Attaining Agl       Attaining Category 2 - Attaining Some Uses	On the Planning List due to: 1. Former <u>turbidity</u> standard exceedances (5 of 24 samples). Monitoring will be scheduled to determine whether bottom deposit violations are occurring. 2. <u>Escherichia coli</u> exceedance (in 2000).		EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.
Verde River Horseshoe Dam - Alder Creek 11 miles AZ15060203-008	A&Ww    Inconclusive FC        Inconclusive FBC       Inconclusive Agl       Inconclusive Agl       Attaining Category 2 – Attaining Some Uses	On the Planning List due to <u>missing core parameters</u> : <u>Escherichia coli</u> , total boron, dissolved metals (copper, cadmium, and zinc), and total mercury.		



**TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Verde River Bartlett Dam - Camp Creek 7 miles AZ15060203-004	A&Ww Impaired FC Attaining FBC Attaining DWS Attaining Agl Attaining AgL Attaining Category 5 — Impaired		Add copper to the 2004 303(d) List due to exceedances of chronic copper standards in 4 of 80 sampling events.  Add selenium to the 2004 303(d) List due to exceedances in 4 of 23 sampling events.	
Verde River Camp Creek - Sycamore Creek 12 miles AZ15060203-003	A&Ww Inconclusive FC Inconclusive FBC Attaining DWS Inconclusive Agl Inconclusive AgL Inconclusive Category 2 — Attaining Some Uses	On the Planning List due to missing core parameters: dissolved cadmium and total metals (mercury, arsenic, chromium, lead, manganese, and copper).		
Verde River Sycamore Creek - Salt River 7 miles AZ15060203-001	A&Ww Inconclusive FC Inconclusive FBC Inconclusive DWS Inconclusive Agl Inconclusive AgL Inconclusive Category 3 — Inconclusive	On the Planning List due to insufficient monitoring events for core parameters (although 3 sampling events, there were only one or two samples for each of the core parameters).		
Webber Creek headwaters - East Verde River 14 miles AZ15060203-058	A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 — Inconclusive	On the Planning List (no current monitoring data). Added in 2002 due to insufficient monitoring data.		
West Clear Creek Meadow Canyon - Verde River 65 miles AZ15060203-026B (Reach was split into coldwater and warmwater segments since the last assessment. No current data in 026A.)	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive Category 3 — Inconclusive	On the Planning List due to missing core parameters: total boron, <i>Escherichia coli</i> , dissolved zinc, and total metals (mercury, manganese, copper, and lead).		
Wet Beaver Creek Long Canyon - Ranick Canyon 7 miles AZ15060202-004	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive Category 3 — Inconclusive	On the Planning List due to missing core parameters: total boron, <i>Escherichia coli</i> , dissolved metals (copper and zinc), and total metals (mercury, manganese, copper, and lead).		
Wet Beaver Creek Ranick Canyon - Dry Beaver Creek 7 miles AZ15060202-003	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive AgL Inconclusive Category 3 — Inconclusive	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Wet Bottom Creek headwaters - Verde River 20 miles AZ15060203-020	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Category 3 — Inconclusive	On the Planning List. No current monitoring data. Added in 2002 due to insufficient monitoring data.		

**TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
<b>VERDE WATERSHED -- LAKE ASSESSMENTS</b>				
Bartlett Lake 2375 acres AZL15060203-0110	A&Ww Inconclusive FC Attaining FBC Inconclusive DWS Attaining Agl Attaining Agl Attaining Category 2 – Attaining Some Uses Trophic status – Mesotrophic - Hypereutrophic	On the Planning List due to <u>missing core parameters</u> : <i>Escherichia coli</i> and dissolved metals (copper, cadmium, and zinc).		
Fountain Lake 25 acres AZL15060203-0003	A&Ww Inconclusive FBC Inconclusive FC Inconclusive Category 3 – Inconclusive Trophic status not calculated	On the Planning List due to insufficient monitoring data to assess (only 1 sample).		
Granite Basin Lake 7 acres AZL15060202-0580	A&Ww Inconclusive FC Attaining FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 2 – Attaining Some Uses Trophic status -- Eutrophic	On the Planning List due to: 1. High pH (2 of 6 samples). 2. <u>Chronic ammonia</u> exceedance (1 of 6 sampling events). 3. <u>Missing core parameters</u> : <i>Escherichia coli</i> and dissolved metals (copper, cadmium, and zinc).	<u>Delist dissolved oxygen</u> . EPA placed this lake on the 2002 303(d) List due to 3 violations in 7 samples. Violations have since been determined to be natural due to lake turnover.	
Green Valley Lake 13 acres AZL15060203-0015	A&Ww Inconclusive FC Inconclusive PBC Inconclusive Category 3 – Inconclusive Trophic status not calculated	On the Planning List (no current monitoring data). Added in 2002 due to insufficient monitoring data.		
Horseshoe Reservoir 2000 acres AZL15060203-0620	A&Ww Inconclusive FC Inconclusive FBC Inconclusive Agl Inconclusive Agl Inconclusive Category 3 – Inconclusive Trophic status not calculated	On the Planning List due to: 1. Former <u>turbidity</u> standard exceedances (4 of 18 samples). Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed. 2. <u>Missing core parameters</u> : total boron, <i>Escherichia coli</i> , dissolved metals (copper, cadmium, and zinc), and total metals (mercury, manganese, copper, and lead).		
J.D. Dam Lake 29 acres AZL15060202-0700	A&Wc Inconclusive FC Attaining FBC Inconclusive Agl Attaining Agl Attaining Category 2 – Attaining Some Uses Trophic status – Eutrophic	On the Planning List due to: 1. Low pH (1 of 5 samples). 2. <u>Missing core parameters</u> : <i>Escherichia coli</i> and dissolved metals (copper and cadmium).		
Pecks Lake 95 acres AZL15060202-1060	A&Wc Not attaining FC Attaining FBC Inconclusive Agl Attaining Agl Attaining Category 4A – Not attaining Trophic status – Eutrophic	On the Planning List due to: 1. TMDL follow-up monitoring for low <u>dissolved oxygen</u> (2 of 7 samples). 2. <u>Missing core parameters</u> : <i>Escherichia coli</i> , turbidity, and dissolved metals (cadmium, copper, and zinc).		Nutrient TMDL to address high pH and low dissolved oxygen problems was approved by EPA in 2000. Placed on the Planning List in 2002 for TMDL follow-up monitoring.



TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Perkins Tank 4 acres AZL15060202-1080	A&Wc Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 — Inconclusive Trophic status not calculated	On the Planning List due to: 1. Insufficient monitoring data to assess (only 2 samples). 2. Low <u>dissolved oxygen</u> (2 of 2 samples). 3. Former <u>turbidity</u> standard exceedance (1 of 1 sample). Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed.		
Scholze Lake 22 acres AZL15060202-1350	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 — Inconclusive Trophic status not calculated	On the Planning List due to: 1. Low <u>dissolved oxygen</u> (1 of 3 samples). 2. <u>Chronic lead</u> exceedance (1 of 1 sampling event). 3. Total <u>nitrogen</u> exceedance (2 of 4 samples). 4. Former <u>turbidity</u> standard exceedance (1 of 3 samples). Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed. 5. <u>Missing core parameters</u> : <i>Escherichia coli</i> , dissolved metals (copper and cadmium), and total metals (mercury, copper, and lead).		
Stehr Lake 20 acres AZL15060203-1480	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive Category 3 — Inconclusive Trophic status — Mesotrophic	On the Planning List (no current monitoring data). Added in 2002 due to missing core parameter.		
Stoneman Lake 125 acres AZL15060202-1490	A&Wc Not attaining FC Attaining FBC Not attaining AgL Not attaining AgL Not attaining Category 4A — Not Attaining Trophic status — Mesotrophic	On the Planning List for: 1. TMDL follow up monitoring for <u>high pH</u> (6 of 10 samples). 2. <u>Arsenic</u> exceedance (2 of 8 samples). 4. <u>Missing core parameter</u> : <i>Escherichia coli</i> .		Nutrient TMDL to address low <u>dissolved oxygen</u> and <u>high pH</u> was approved by EPA in 2000. Placed on the Planning List in 2002 for TMDL follow-up monitoring.  Note that the lake has been totally or near dry for the last two years due to drought conditions.
Sullivan Lake 1 acres AZL15060202-3370	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive AgL Inconclusive Category 3 — Inconclusive Trophic status not calculated	On the Planning List (no current monitoring data). Added in 2002 due to <u>high pH</u> (1 of 3 samples) and missing core parameters.		
Watson Lake 152 acres AZL15060202-1590	A&Ww Inconclusive FC Inconclusive FBC Inconclusive AgL Inconclusive AgL Inconclusive Category 3 — Inconclusive Trophic status — Eutrophic	On the Planning List due to: 1. Low <u>dissolved oxygen</u> (1 of 5 samples). 2. High <u>pH</u> (2 of 5 samples). 3. Total <u>nitrogen</u> exceedance (2 of 5 samples). 4. Fish kill in 2000. 5. <u>Missing core parameters</u> : total boron, <i>Escherichia coli</i> , turbidity, dissolved metals (copper and cadmium), and total metals (mercury, copper, lead, and zinc).		Fish kill in 2000 associated with a blue-green algae and high pH (9.5 - 9.8). This algae can produce a toxin that can kill fish and is associated with lakes with high pH and elevated nutrients. This fish kill may be evidence of a narrative nutrient standard violation.

**TABLE 24. VERDE WATERSHED — ASSESSMENT, PLANNING LIST, AND 303(d) STATUS TABLE**

SURFACE WATER DESCRIPTION	2004 ASSESSMENT 5-CATEGORIES LAKE TROPHIC STATUS	2004 PLANNING LIST	STATUS OF 2002 303(d) LIST RECOMMENDATIONS FOR 2004 LIST	OTHER INFORMATION
Whitehorse Lake 41 acres AZL15060202-1630	A&Wc    Impaired FC        Inconclusive FBC       Inconclusive DWS       Attaining Agl        Attaining AgL        Attaining Category 5 – Impaired Trophic status – Eutrophic	On the Planning List due to: 1. <u>Chronic ammonia</u> exceedance in 2 of 13 samples events (15% exceed). 2. Former <u>turbidity</u> standard exceedances (9 of 9 samples). Further investigation into the causes and sources of turbidity will be scheduled during the next monitoring cycle for this watershed. 3. Fish kill in 1999. 4. <u>Missing core parameters</u> : <i>Escherichia coli</i> , dissolved metals (copper, cadmium, and zinc).	EPA placed this lake on the 2002 303(d) List for low <u>dissolved oxygen</u> based on 5 of 11 exceedances. Arizona's Impaired Water Identification Rule requires a minimum of 20 samples to base a listing decision for dissolved oxygen. However, once listed the lake cannot be delisted until a TMDL is complete or dissolved oxygen data indicate designated uses are being attained. Current data show low dissolved oxygen in 4 of 14 samples.	Fish kill in 1999 related to algal bloom and low dissolved oxygen which may be evidence of a narrative standard violation.  EPA may use exceedances of the former turbidity standard as an indicator of narrative standards violations and place this reach on the 2004 303(d) List due to turbidity.



## V. 2004 303(d) List, Assessment Categories, and TMDL Schedule

While Chapter IV provides a comprehensive look at Arizona's water quality assessment, it is primarily useful for looking up information on specific waters. However, it would take a good deal of time to find in Chapter IV just how many waters are assessed as "impaired," or to find just those waters that are assessed as "attaining all uses." This chapter provides a summary of the state's water quality assessment to the public and to EPA, beginning with statewide assessment maps for streams and lakes.

**The Five Category Assessment List** – Surface waters assessed in 2004 are organized by Category in **Tables 25 through 29**.

- Category 1** Surface waters assessed as "attaining all uses." All designated uses are assessed as "attaining."
- Category 2** Surface waters assessed as "attaining some uses." Each designated use is assessed as either "attaining," "inconclusive," or "threatened."
- Category 3** Surface waters assessed as "inconclusive." All designated uses are assessed as "inconclusive" due to insufficient data to assess any designated use (e.g., insufficient samples or core parameters). By default, this category would include waters that were "not assessed" for similar reasons. (See note below.)
- Category 4** Surface waters assessed as "not attaining." At least one designated use was assessed as "not attaining" and no uses were assessed as "impaired." A Total Maximum Daily Load (TMDL) analysis will not be required at this time for one of the following reasons:
- 4 A.** A TMDL has already been completed and approved by EPA but the water quality standards are not yet attained;
  - 4 B.** Other pollution control requirements are reasonably expected to result in the attainment of water quality standards by the next regularly scheduled listing cycle; or
  - 4 C.** The impairment is not related to a "pollutant" loading but rather due to "pollution" (e.g., hydrologic modification).
- Category 5** Surface waters assessed as "impaired." At least one designated use was assessed as "impaired" by a pollutant. These waters must be prioritized for TMDL development (**Table 31** at the

end of this chapter).

The five part list assists the state in identifying monitoring needs. For example, Category 1 waters will be monitored as part of the rotating watershed cycle as

### Category 5 - 303(d) List

The 303(d) List identifies, by surface water segment, the pollutants or surface water characteristics not meeting surface water quality standards. The 303(d) List is a list of all impaired waters that require more than existing technology and permit controls to achieve or maintain surface water quality standards. EPA must approve this list and has the authority to add or remove surface waters from the list based on the federal Clean Water Act, regulations, or policies.

The objective is to systematically identify impaired surface waters and the pollutant(s) causing the impairment and ultimately establish a scientifically-based strategy (a TMDL) for restoring the surface water quality.

The status of TMDLs in progress or completed are highlighted in Chapter VIII. TMDL investigations have been initiated or completed on many of the surface waters on the 2002 303(d) List.

resources allow; while Category 2, 3, and 4 waters are placed on the Planning List and targeted for further monitoring over the next two watershed cycles. Category 5 waters are placed on the 303(d) List and scheduled for monitoring to support development of a TMDL.

Based on monitoring and assessments, a surface water can move from one category to another. The objective is to eventually have all surface waters attaining uses.

Note that many surface waters in Arizona could not be assessed because water quality data or information was not collected during the monitoring period covered by this assessment. By default, all of these waters would be included in Category 3. These waters are not specifically named in this report, except for those placed on the Planning List in 2002. Once placed on the Planning List, these waters remain on the Planning List and appear in Category 3 until sufficient data are collected to make a complete assessment of all uses. Most surface waters lacking monitoring data are ephemeral or only flow for a short time, making it difficult to collect sufficient water quality data. As discussed in Chapter VIII, ADEQ's Ambient Monitoring Program is attempting to monitor and assess all perennial waters.

# Statewide Assessment Map for Streams

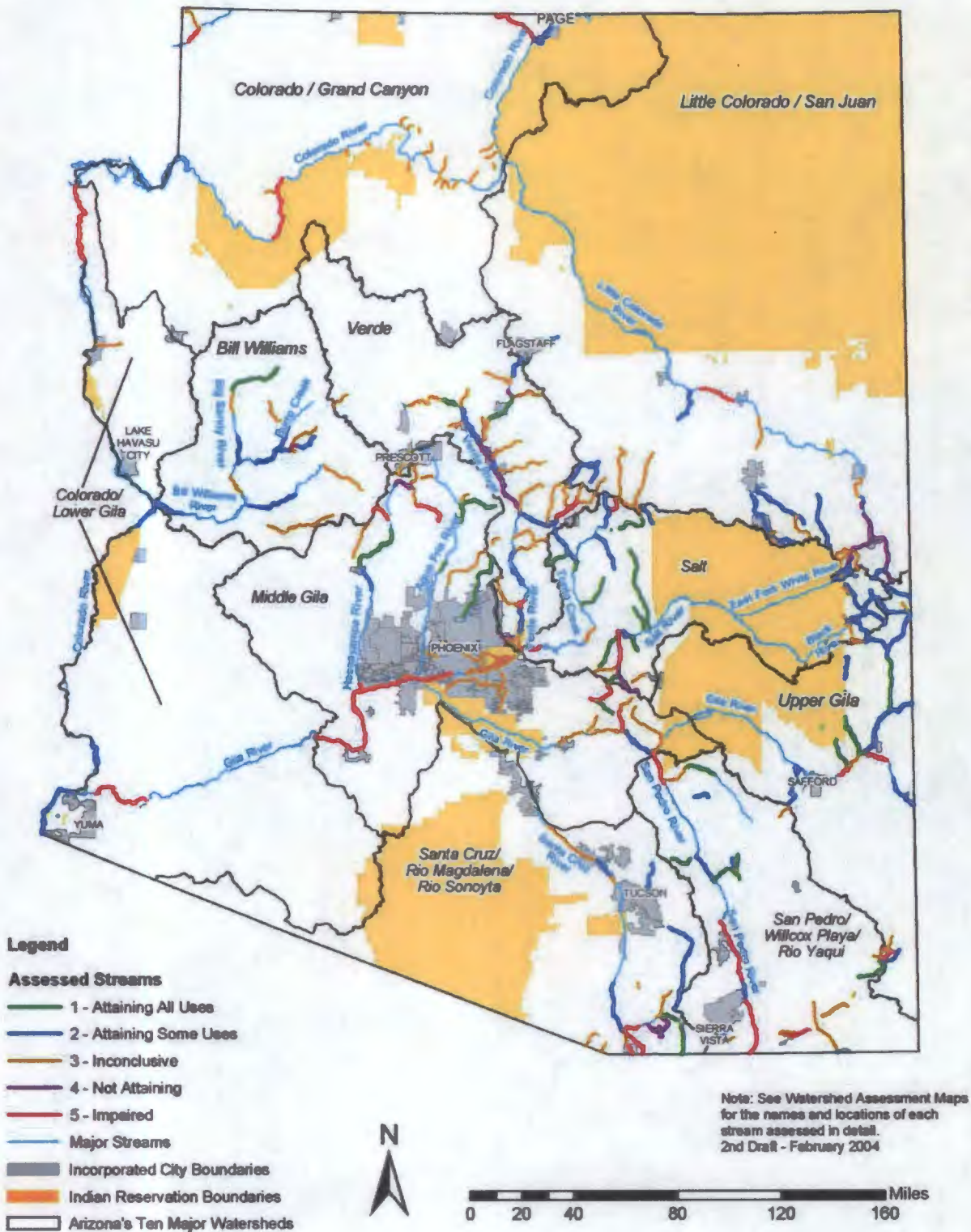


Figure 25. 2004 assessments of streams



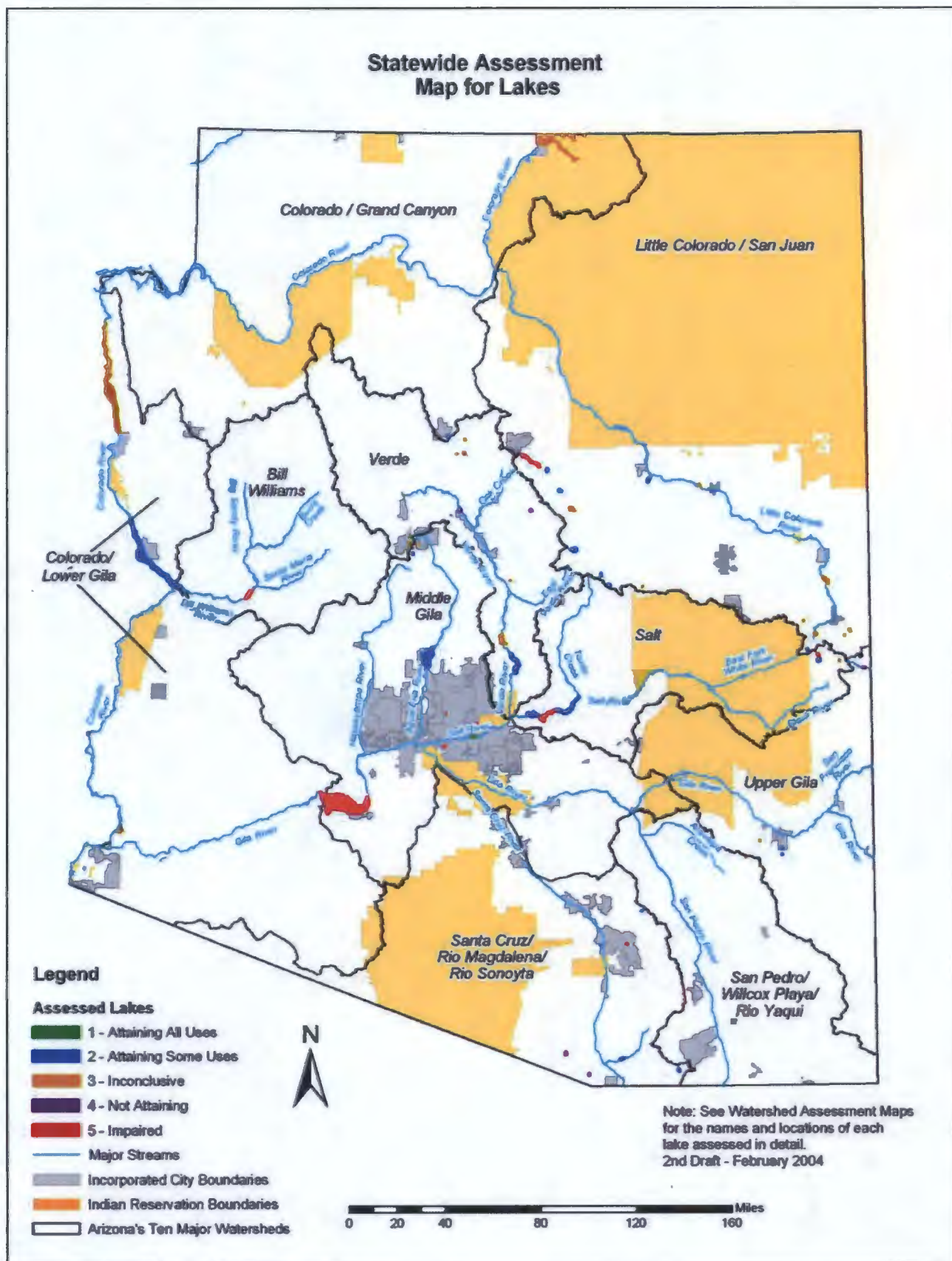


Figure 26. 2004 assessments of lakes

## Assessment Categories and Planning List

**Table 25. Category 5 – Impaired Waters  
2004 303(d) List Submitted to EPA August 2004**

At Least One Designated Use Assessed as "Impaired"  
TMDL development is required for these waters.

Surface Water	Reach or Lake Number	On the 2004 303(d) List Pollutants or Parameters of Concern	Other Pollutants or Parameters of Concern Requiring Further Monitoring
<b>Bill Williams Watershed</b>			
Alamo Lake	AZL15030204-0040	Yes: Mercury in fish tissue (EPA*), pH (high), adding ammonia	Yes: Missing core parameters
Boulder Creek Wilder Creek - Copper Creek	AZ15030202-005A	Yes: Arsenic, copper, zinc (Note copper and zinc impairment limited to segment from Wilder to Butte Creek)	Yes: Mercury, selenium, missing core parameters
<b>Colorado - Grand Canyon Watershed</b>			
Colorado River Parashant Canyon - Diamond Creek	AZ15010002-003	Yes: Adding selenium, adding suspended sediment concentration	Yes: Turbidity, missing core parameters
Paria River Utah border - Colorado River	AZ14070007-123	Yes: Adding suspended sediment concentration	Yes: Turbidity, missing core parameters
Virgin River Beaver Dam Wash - Big Bend Wash	AZ15010010-003	Yes: Adding selenium, add suspended sediment concentration	Yes: Turbidity, missing core parameters
<b>Colorado - Lower Gila Watershed</b>			
Colorado River Hoover Dam - Lake Mohave	AZ15030101-015	Yes: Adding selenium	Yes: Missing core parameters
Gila River Coyote Wash - Fortuna Wash	AZ15070201-003	Yes: Adding boron, adding selenium	No
Painted Rock Borrow Pit Lake	AZL15070201-1010	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*), dissolved oxygen	Yes: Ammonia, pH (high), missing core parameters
<b>Little Colorado - San Juan Watershed</b>			
Lake Mary (lower)	AZL15020015-0890	Yes: Mercury in fish tissue (EPA*)	Yes: Insufficient monitoring
Lake Mary (upper)	AZL15020015-0900	Yes: Mercury in fish tissue (EPA*)	Yes: Turbidity, insufficient monitoring
Little Colorado River Silver Creek - Carr Wash	AZ15020002-004	Yes: Adding <i>Escherichia coli</i>	Yes: Lead, turbidity/suspended sediment concentration
Little Colorado River Porter Tank Draw - McDonalds Wash	AZ15020008-017	Yes: Copper, silver, suspended sediment concentration	Yes: Missing core parameters



Surface Water	Reach or Lake Number	On the 2004 303(d) List Pollutants or Parameters of Concern	Other Pollutants or Parameters of Concern Requiring Further Monitoring
<b>Middle Gila Watershed</b>			
Alvord Park Lake	AZL15060106B-0050	Yes: Adding ammonia	Yes: <i>Escherichia coli</i> , missing core parameters
Chaparral Lake	AZL15060106B-0300	Yes: Adding dissolved oxygen, adding <i>Escherichia coli</i>	Yes: Missing core parameters
Cortez Park Lake	AZL15060106B-0410	Yes: Adding dissolved oxygen, adding pH (high)	Yes: Fish kill (1999), missing core parameters
French Gulch headwaters - Hassayampa River	AZ15070103-239	Yes: Copper, zinc, adding cadmium	Yes: Missing core parameters
Gila River Salt River - Agua Fria River	AZ15070101-015	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)	No
Gila River Agua Fria River - Waterman Wash	AZ15070101-014	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)	Yes: Insufficient monitoring
Gila River Waterman Wash - Hassayampa River	AZ15070101-010	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)	Yes: Insufficient monitoring
Gila River Hassayampa River - Centennial Wash	AZ15070101-009	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)	Yes: Insufficient monitoring
Gila River Centennial Wash - Gillespie Dam	AZ15070101-008	Yes: DDT metabolites, toxaphene, and chlordane in fish tissue (EPA*), boron, adding selenium	Yes: Turbidity/suspended sediment concentration
Gila River Gillespie Dam - Rainbow Wash	AZ15070101-007	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)	Yes: Insufficient monitoring
Gila River Rainbow Wash - Sand Tank	AZ15070101-005	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)	Yes: Insufficient monitoring
Gila River Sand Tank - Painted Rocks Reservoir	AZ15070101-001	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)	Yes: Insufficient monitoring
Hassayampa River Buckeye Canal - Gila River	AZ15070103-001B	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)	Yes: Turbidity/suspended sediment concentration
Mineral Creek Devils Canyon - Gila River	AZ15050100-012B	Yes: Copper, adding selenium	Yes: Turbidity/suspended sediment concentration, missing core parameters
Painted Rocks Reservoir	AZL15070101-1020A	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)	Yes: Insufficient monitoring
Queen Creek headwaters - Superior Mine WWTP	AZ15050100-014A	Yes: Copper	Yes: Missing core parameters
Queen Creek Superior Mine WWTP - Potts Canyon	AZ15050100-014B	Yes: Adding copper	Yes: Selenium, missing core parameters
Salt River 23 <sup>rd</sup> Ave WWTP - Gila River	AZ15060106B-001D	Yes: DDT metabolites, toxaphene and chlordane in fish tissue (EPA*)	No

Surface Water	Reach or Lake Number	On the 2004 303(d) List Pollutants or Parameters of Concern	Other Pollutants or Parameters of Concern Requiring Further Monitoring
Turkey Creek unnamed tributary at 34 19°28'1122128 - Poland Creek	AZ15070102-036B	Yes: Cadmium, copper, zinc, adding lead	Yes: Arsenic, missing core parameters
<b>Salt River Watershed</b>			
Canyon Lake	AZL15060106A-0250	Yes: Adding dissolved oxygen	Yes: Ammonia and missing core parameters
Christopher Creek headwaters - Tonto Creek	AZ15060105-353	Yes: Adding <i>Escherichia coli</i>	Yes: Turbidity/suspended sediment concentration
Crescent Lake	AZL15060101-0420	Yes: pH (high, EPA*)	Yes: Total nitrogen, fish kill (in 1998), missing core parameters
Pinto Creek Ripper Spring - Roosevelt Lake	AZ15060103-018C	Yes: Adding selenium, adding copper	No
Salt River Stewart Mountain Dam - Verde River	AZ15060106A-003	Yes: Adding dissolved oxygen, adding copper	Yes: <i>Escherichia coli</i>
<b>San Pedro - Willcox Playa - Rio Yaqui Watershed</b>			
Mule Gulch headwaters - above Lavender Pit	AZ15080301-090A	Yes: Copper	Yes: Missing core parameters.
Mule Gulch above Lavender Pit - Bisbee WWTP	AZ15080301-090B	Yes: Copper, pH (low, EPA*)	Yes: Lead, missing core parameters
Mule Gulch Bisbee WWTP - Highway 80 Bridge	AZ15080301-090C	Yes: Copper, zinc, pH (low), adding cadmium	Yes: Lead, missing core parameters
San Pedro River Mexico border - Charleston	AZ15050202-008	Yes: Copper	Yes: Selenium
San Pedro River Babocomari Creek - Dragoon Wash	AZ15050202-003	Yes: Adding <i>Escherichia coli</i>	No
San Pedro River Dragoon Wash - Tres Alamos Wash	AZ15050202-002	Yes: Nitrate	Yes: Fecal coliform/ <i>Escherichia coli</i> , suspended sediment concentration /turbidity, missing core parameters
San Pedro River Aravaipa Creek - Gila River	AZ15050203-001	Yes: Adding <i>Escherichia coli</i> , adding selenium	Yes: Mercury
<b>Santa Cruz - Rio Magdalena - Rio Sonoyta</b>			
Lakeside Lake	AZL15050302-0760	Yes: Adding dissolved oxygen, adding ammonia	Yes: Turbidity, missing core parameters
Nogales and East Nogales washes Mexico border - Potrero Creek	AZ15050301-011	Yes: Chlorine, adding <i>Escherichia coli</i> , adding ammonia, adding copper	Yes: Turbidity/suspended sediment concentration
Santa Cruz River Mexico border - Nogales WWTP	AZ15050301-010	Yes: <i>Escherichia coli</i>	No



Surface Water	Reach or Lake Number	On the 2004 303(d) List Pollutants or Parameters of Concern	Other Pollutants or Parameters of Concern Requiring Further Monitoring
Sonoita Creek 750 feet below WWTP - Santa Cruz River	AZ15050301-013C	Yes: Adding zinc	Yes: Copper, dissolved oxygen
<b>Upper Gila Watershed</b>			
Cave Creek headwaters - South Fork of Cave Creek	AZ15040006-852A	Yes: Adding selenium	No
Gila River Skully Creek - San Francisco River	AZ15040002-001	Yes: Adding selenium	Yes: Dissolved oxygen, lead
Gila River Bonita Creek - Yuma Wash	AZ15040005-022	Yes: Adding <i>Escherichia coli</i>	Yes: Copper, lead, turbidity/suspended sediment concentration
<b>Verde Watershed</b>			
East Verde River Ellison Creek - American Gulch	AZ15060203-022B	Yes: Adding selenium	
Verde River Bartlett Dam - Camp Creek	AZ15060203-004	Yes: Adding selenium, copper	
Whitehorse Lake	AZL15060202-1630	Yes: Dissolved oxygen (EPA*)	Yes: Ammonia, turbidity, fish kill in 1999, missing core parameters

\* Indicates that EPA placed the pollutant or parameter on the 2002 303(d) List, rather than ADEQ.

**Table 26. Category 4 – Not Attaining (Impaired) Waters**

At Least One Designated Use Assessed as “Not Attaining”  
All Waters are On the Planning List for Follow Up Monitoring

4A = A TMDL has been approved by EPA but designated uses are not yet “attaining.”

4B = Other pollution control requirements are expected to result in the attainment of water quality standards by the next regularly scheduled listing cycle (2 years currently).

4C = The impairment is not related to a “pollutant” loading, but caused by pollution (e.g., hydrologic modifications).

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern
<b>Bill Williams Watershed</b> (no Category 4 waters)		
<b>Colorado - Grand Canyon Watershed</b> (no Category 4 waters)		
<b>Colorado - Lower Gila Watershed</b> (no Category 4 waters)		
<b>Little Colorado - San Juan Watershed</b>		
Little Colorado River West Fork of the Little Colorado River - Water Canyon Creek	AZ15020001-011	Yes 4A: Turbidity/suspended sediment concentration (turbidity TMDL approved for adjacent reaches in 2002) Other: Missing core parameters
Little Colorado River Water Canyon Creek - Nutrioso Creek	AZ15020001-010	Yes 4A: Turbidity/suspended sediment concentration (turbidity TMDL approved in 2002) Other: Insufficient monitoring
Little Colorado River Nutrioso Creek - Camero Wash	AZ15020001-009	Yes 4A: Turbidity/suspended sediment concentration (turbidity TMDL approved in 2002) Other: <i>Escherichia coli</i>
Little Colorado River unnamed reach (15020001-021) to Lyman Lake	AZ15020001-005	Yes 4A: Turbidity/suspended sediment concentration (turbidity TMDL approved for adjacent reaches in 2002) Other: <i>Escherichia coli</i>
Nutrioso Creek headwaters - Picnic Creek	AZ15020001-017	Yes 4A: Turbidity/suspended sediment concentration (turbidity TMDL approved in 2000)
Nutrioso Creek Picnic Creek - Little Colorado River	AZ15020001-015	Yes 4A: Turbidity/suspended sediment concentration (turbidity TMDL approved in 2000) Other: Insufficient monitoring
Rainbow Lake	AZL15020005-1170	Yes 4A: Nutrients and pH (TMDLs approved in 2000) Other: Missing core parameters
<b>Middle Gila Watershed</b>		
Cash Mine Creek headwaters - Hassayampa River	AZ15070103-349	Yes 4A: Copper, zinc (metals loadings addressed in Hassayampa TMDLs approved in 2002) Other: Insufficient monitoring
Cash Mine Creek, <u>unnamed tributary of</u> headwaters - Cash Mine Creek	AZ15070103-415	Yes 4A: Cadmium, copper, zinc (loadings addressed in Hassayampa TMDLs approved in 2002) Other: Lead, insufficient monitoring
Hassayampa River headwaters - Copper Creek	AZ15070103-007A	Yes 4A: Cadmium, copper, zinc, and pH (TMDLs approved in 2002) Other: Missing core parameters
<b>Salt River Watershed</b>		



Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern
Gibson Mine tributary headwaters - Pinto Creek	AZ15060103-887	Yes 4A: Copper (loading addressed in Pinto Creek copper TMDL approved in 2001) Other: pH (low), zinc, missing core parameters
Pinto Creek headwaters - tributary at 33 19°27'N/110 54°56"	AZ15060103-018A	Yes 4A: Copper (TMDL approved in 2001) Other: Insufficient monitoring
Pinto Creek tributary at 33 19°27'N/110 54°56" - Ripper Spring	AZ15060103-018B	Yes 4A: Copper (TMDL approved in 2001) Other: Selenium, zinc, missing core parameters
<b>San Pedro - Willcox Playa - Rio Yaqui Watershed</b> (no Category 4 waters)		
<b>Santa Cruz - Rio Magdalena - Rio Sonoyta</b>		
Alum Gulch headwaters - 31 28°20'N/110 43°51"	AZ15050301-561A	Yes 4A: Cadmium, copper, pH (low), zinc (TMDLs approved in 2003) Other: Missing core parameter
Alum Gulch 31 28°20'N/110 43°51" - 31 29°17'N/110 44°25"	AZ15050301-561B	Yes 4A: Cadmium, copper, pH (low), zinc (TMDLs approved in 2003) Other: Missing core parameters
Arivaca Lake	AZL15050304-0080	Yes 4A: Mercury in fish tissue (TMDL approved in 1999) Other: Dissolved oxygen, pH (high), selenium, fish kill in 1999, missing core parameters
Cox Gulch headwaters - 3R Canyon	AZ15050301-560	Yes 4A: Cadmium, copper, zinc, and pH (low) (loadings included in 3R Canyon TMDLs approved in 2003) Other: Missing core parameters
Cox Gulch, <u>unnamed tributary of</u> headwaters - Cox Gulch	AZ15050301-877	Yes 4A: Cadmium, copper, zinc, and pH (low) (loadings included in 3R Canyon TMDLs approved in 2003) Other: Insufficient monitoring
Harshaw Creek headwaters - Sonoita Creek	AZ15050301-025	Yes 4A: Copper and pH (low) (TMDLs approved in 2003) Other: Missing core parameter
Harshaw Creek, <u>unnamed tributary of</u> (Endless Chain Mine tributary) headwaters - Harshaw Creek	AZ15050301-888	Yes 4A: Copper and pH (low) (loadings included in TMDLs for Harshaw Creek approved in 2003)
Humbolt Canyon headwaters - Alum Gulch	AZ15050301-340	Yes 4A: Cadmium, copper, zinc, and pH (low) (TMDLs for Alum Gulch approved in 2003) Other: Missing core parameters
Pena Blanca Lake	AZL15050301-1070	Yes 4A: Mercury in fish tissue (TMDL approved in 1999) Other: pH (low), selenium, turbidity, missing core parameters
Three R Canyon headwaters - 31 28°35'N/110 46°19"	AZ15050301-558A	Yes 4A: Cadmium, copper, zinc, and pH (low) (TMDLs approved in 2003) Other: Insufficient monitoring
Three R Canyon 31 28°35'N/110 46°19"-31 28°27'N/110 47°12"	AZ15050301-558B	Yes 4A: Cadmium, copper, zinc, and pH (low) (TMDLs approved in 2003) Other: Missing core parameters
Three R Canyon 31 28°27'N/110 47°12" - Sonoita Creek	AZ15050301-558C	Yes 4A: Copper and pH (low) (TMDLs approved in 2003) Other: Missing core parameter
Three R Canyon, <u>unnamed tributary of</u> headwaters - Three R Canyon	AZ15050301-889	Yes 4A: Cadmium, copper, zinc, and pH (low) (loadings for this tributary included in the TMDLs for 3R Canyon approved in 2003) Other: Insufficient monitoring

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern
<b>Upper Gila Watershed</b>		
Luna Lake	AZL15040004-0840	Yes 4A: Dissolved oxygen, pH (high), and a fish kill in 1999 (Nutrient TMDL approved in 2000. TMDL addressed low dissolved oxygen, high pH, and fish kills.) Other: Missing core parameters
<b>Verde Watershed</b>		
Grande Wash headwaters - Ashbrook Wash	AZ15060203-991	Yes 4B: <i>Escherichia coli</i> (Fountain Hills WWTP has now changed disposal method to recharge, thereby eliminating discharges to this wash. <i>E. coli</i> levels are expected to meet water quality standards for the next assessment.) Other: Missing core parameters
Oak Creek At Slide Rock State Park	AZ15060202-018B	Yes 4A: <i>Escherichia coli</i> and swimming closures (TMDL approved in 1999) Other: Missing core parameters
Pecks Lake	AZL15060202-1060	Yes 4A: Dissolved oxygen (nutrient TMDL approved in 2000 addressed low dissolved oxygen.) Other: Missing core parameters
Stoneman Lake	AZL15060202-1490	Yes 4A: pH (high) (nutrient TMDL approved in 2000 addressed high pH.) Other: Arsenic, missing core parameters
Verde River Oak Creek - Beaver Creek	AZ15060202-015	Yes 4A: Turbidity/suspended sediment concentration (turbidity TMDL approved in 2002) Other: Insufficient monitoring
Verde River Beaver Creek - HUC boundary 15060203	AZ15060202-001	Yes 4A: Turbidity/suspended sediment concentration (turbidity TMDL approved in 2002) Other: Insufficient monitoring
Verde River West Clear Creek - Fossil Creek	AZ15060203-025	Yes 4A: Turbidity/suspended sediment concentration (turbidity TMDL approved in 2002 in adjacent reaches) Other: Selenium



**Table 27. Category 3 – Inconclusive Waters**

All Designated Uses Assessed as "Inconclusive"

All Waters are On the Planning List for Follow Up Monitoring

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern
<b>Bill Williams Watershed</b>		
Big Sandy River Deluge Wash - Tule Wash	AZ15030201-011	Yes: Turbidity/Suspended sediment concentration, missing core parameters
Big Sandy River Rupley Wash - Alamo Lake North	AZ15030201-001	Yes: Dissolved oxygen, missing core parameters
Butte Creek headwaters - Boulder Creek	AZ15030202-163	Yes: Mercury, selenium, missing core parameters
Date Creek Cottonwood Creek - unnamed tributary (15030203-008)	AZ15030203-003	Yes: Insufficient monitoring
Francis Creek headwaters - Burro Creek	AZ15030202-012	Yes: Turbidity/Suspended sediment concentration, insufficient monitoring
Kirkland Creek Skull Valley - Santa Maria River	AZ15030203-015	Yes: <i>Escherichia coli</i> , insufficient monitoring
Wilder Creek headwaters - Boulder Creek	AZ15030202-007	Yes: Missing core parameters
<b>Colorado - Grand Canyon Watershed</b>		
Beaver Dam Wash Utah border - Virgin River	AZ15010010-009	Yes: Insufficient monitoring
Boucher Creek California Wash - Colorado River	AZ15010002-017	Yes: Insufficient monitoring
Chuar (Lava) Creek tributary at 36 11'36"/111 52'17" - Lava Creek	AZ15010001-024B	Yes: Insufficient monitoring
Clear Creek tributary at 36 09'12"/111 58'25" - Colorado River	AZ15010001-025B	Yes: Insufficient monitoring
Crystal Creek tributary at 36 13'42"/112 11'48" - Colorado River	AZ15010002-018B	Yes: Insufficient monitoring
Deer Creek tributary at 36 26'16"/112 28'15.5" - Colorado River	AZ15010002-019B	Yes: Insufficient monitoring
Garden Creek headwaters - Pipe Creek	AZ15010002-841	Yes: Insufficient monitoring
Havas Canyon Creek Havasupai Indian Reservation - Colorado River	AZ15010004-001	Yes: Turbidity/suspended sediment concentration, insufficient monitoring

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern
Hermit Creek Hermit Pack Trail crossing - Colorado River	AZ15010002-020B	Yes: Insufficient monitoring
Kwagunt Creek tributary at 36 1°3'29"/111 5°5'24" - Colorado River	AZ15010001-031B	Yes: Insufficient monitoring
Lake Powell	AZL14070006-1130	Yes: <i>Escherichia coli</i> , missing core parameters
Monument Creek headwaters - Colorado River	AZ15010002-845	Yes: Insufficient monitoring
Nankoweap Creek tributary at 36 1°5'30"/111 5°7'23" - Colorado River	AZ15010001-033B	Yes: Insufficient monitoring
National Canyon Creek headwaters - Colorado River	AZ15010002-016	Yes: Insufficient monitoring
Royal Arch Creek headwaters - Colorado River	AZ15010002-871	Yes: Insufficient monitoring
Saddle Canyon Creek tributary at 36 2°1'35.5"/112 2°2'46" - Colorado River	AZ15010002-703B	Yes: Insufficient monitoring
Shinumo Creek tributary at 36 1°8'21"/112 1°8'03" - Colorado River	AZ15010002-029B	Yes: Insufficient monitoring
Spring Canyon Creek headwaters - Colorado River	AZ15010002-318	Yes: Insufficient monitoring
Tapeats Creek headwaters - Colorado River	AZ15010002-696	Yes: Insufficient monitoring
Three Springs Creek headwaters - Colorado River	AZ15010002-1180	Yes: Insufficient monitoring
Vasey's Paradise (Spring) at Colorado River	AZ15010001-SP01	Yes: Insufficient monitoring
<b>Colorado - Lower Gila Watershed</b>		
Colorado River, <u>unnamed tributary</u> (near Thumb Butte) headwaters - Colorado River	AZ15030101-560	Yes: Insufficient monitoring
Hunter's Hole (lake)	AZL15030108-0660	Yes: Selenium, insufficient monitoring
Lake Mohave	AZL15030101-0960	Yes: Insufficient monitoring
Mittry Lake	AZL15030107-0950	Yes: Insufficient monitoring



Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern
<b>Little Colorado - San Juan Watershed</b>		
Black Canyon Lake	AZL15020010-0180	Yes: Fish kill related to fire (2002), insufficient monitoring
Brown Creek headwaters - Silver Creek	AZ15020005-016	Yes: Insufficient monitoring
Buck Springs Canyon Creek headwaters - Leonard Canyon	AZ15020008-557	Yes: pH (low), turbidity/suspended sediment concentration, insufficient monitoring
Bunch Reservoir	AZL15020001-0230	Yes: Dissolved oxygen, missing core parameters
Camero Lake	AZL15020001-0260	Yes: Dissolved oxygen, pH (high), missing core parameters
Chevelon Creek headwaters - West Chevelon Creek	AZ15020010-006	Yes: Dissolved oxygen, insufficient monitoring
Cholla Lake	AZL15020008-0320	Yes: Fish kill (2002), missing core parameters
Fish Creek headwaters - Little Colorado River	AZ15020001-211	Yes: Mercury, insufficient monitoring
Hall Creek headwaters - Little Colorado River	AZ15020001-012	Yes: Insufficient monitoring
Lee Valley Creek Lee Valley Reservoir - East Fork Little Colorado River	AZ15020001-232B	Yes: Insufficient monitoring
Little Colorado River WJC boundary 15020001 - unnamed tributary (15020002-025)	AZ15020002-024	Yes: Insufficient monitoring
Little Colorado River Zion Reservoir - Concho Creek	AZ15020002-016	Yes: Suspended sediment concentration, missing core parameters
Little Colorado River, South Fork headwaters - Little Colorado River	AZ15020001-027	Yes: Insufficient monitoring
Long Lake (lower)	AZL15020008-0820	Yes: Mercury in fish tissue, insufficient seasonal coverage, missing core parameters
Lyman Lake	AZL15020001-0850	Yes: Mercury in fish tissue, insufficient monitoring
McKay Reservoir	AZL15020001-0007	Yes: Dissolved oxygen, pH (high), insufficient monitoring
Nelson Reservoir	AZL15020001-1000	Yes: Insufficient monitoring
Porter Creek headwaters - Shov Low Creek	AZ15020005-246	Yes: Turbidity/suspended sediment concentration, insufficient monitoring
River Reservoir	AZL15020001-1220	Yes: Missing core parameters
Silver Creek Seven Mile Draw- Little Colorado River	AZ15020005-001	Yes: Turbidity/suspended sediment concentration, insufficient monitoring
Soldiers Annex Lake	AZL15020008-1430	Yes: Mercury in fish tissue, insufficient monitoring

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern
Soldiers Lake	AZL15020008-1440	Yes: Mercury in fish tissue, insufficient monitoring
Tunnel Reservoir	AZL15020001-1550	Yes: Dissolved oxygen, missing core parameters
Walnut Creek Pine Lake - Rainbow Lake	AZ15020005-238	Yes: Insufficient monitoring
Willow Creek headwaters - East Clear Creek	AZ15020008-011	Yes: Insufficient monitoring
Willow Spring Creek headwaters - Chevelon Creek	AZ15020010-240	Yes: Insufficient monitoring
Woods Canyon Creek headwaters - Chevelon Creek	AZ15020010-084	Yes: Dissolved oxygen, insufficient monitoring
<b>Middle Gila Watershed</b>		
Antelope Creek headwaters - Martinez Creek	AZ15070103-010	Yes: Insufficient monitoring
Arizona Canal Granite Reef Dam - Cholla water treatment plant	AZ15060106B-099A	Yes: Missing core parameters
Arizona Canal Cholla water treatment plant - HUC boundary 15070102	AZ15060106B-099B	Yes: Missing core parameters
Blue John Creek headwaters - unnamed tributary to Lynx Creek	AZ15070102-471	Yes: Cadmium, copper, zinc, insufficient monitoring
Buckeye Canal Gila River - South Extension Canal	AZ15070101-209	Yes: DDE (DDT pesticide metabolite), missing core parameters
Consolidated Canal HUC boundary 15060106B - above water treatment plant intake	AZ15050100-074A	Yes: Missing core parameters
Dripping Spring Wash headwaters - Gila River	AZ15050100-011	Yes: Insufficient monitoring
Eastern Canal Water treatment plant intake (below Warner Road) - terminus	AZ15050100-207B	Yes: Missing core parameters
Fain Lake	AZL15070102-0005	Yes: Turbidity, insufficient monitoring
Galena Gulch headwaters - Agua Fria River	AZ15070102-745	Yes: Cyanide, insufficient monitoring
Gila River Dripping Spring Wash - San Pedro River	AZ15050100-009	Yes: Insufficient monitoring
Gila River Mineral Creek - Donnelly Wash	AZ15050100-007	Yes: Copper, turbidity/suspended sediment concentration, insufficient monitoring
Gila River Ashurst-Hayden Dam - Florence wastewater treatment plant	AZ15050100-003B	Yes: Copper, insufficient monitoring



Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern
Grand Canal HUC boundary 15070101 - New River	AZ15070102-250	Yes: Missing core parameters
Hassayampa River, <u>unnamed tributary of</u> headwaters - Hassayampa River (segment 007)	AZ15070102-417	Yes: Copper, insufficient monitoring
Indian Bend Wash headwaters - Salt River	AZ15060106B-179	Yes: Lead, missing core parameters
Little Ash Creek headwaters - Ash Creek	AZ15070102-039	Yes: Insufficient monitoring
Lynx Creek headwaters - 34 34°29'/112 21°05"	AZ15070102-033A	Yes: Cadmium, copper, insufficient monitoring
Lynx Creek, <u>unnamed tributary of</u> headwaters - Lynx Creek	AZ15070102-124	Yes: Cadmium, copper, zinc, insufficient monitoring
Martínez Canyon Creek headwaters - Box Canyon	AZ15050100-080	Yes: Insufficient monitoring
Mineral Creek headwaters - Devils Canyon	AZ15050100-012A	Yes: Insufficient monitoring
New River headwaters - Interstate 17	AZ15070102-006A	Yes: Insufficient monitoring
Salt River 2 km below Granite Reef Dam - Interstate 10 bridge	AZ15060106B-001B	Yes: Insufficient monitoring
South Canal Granite Reef Dam - Consolidated Canal	AZ15060106B-180	Yes: Missing core parameters
Tempe Canal HUC boundary 15050100 - Western Canal	AZ15050100-115	Yes: Missing core parameters
Turkey Creek headwaters - unnamed tributary at 34 19°28'/112 21°28"	AZ15070102-036A	Yes: Missing core parameters
Western Canal Tempe Canal - HUC boundary 15050100	AZ15060106B-262	Yes: Missing core parameters
Western Canal HUC boundary 15050100 - terminus	AZ15050100-990	Yes: Missing core parameters
<b>Salt River Watershed</b>		
Bear Wallow Creek, <u>North Fork</u> headwaters - Bear Wallow Creek	AZ15060101-022	Yes: Missing core parameters
Bear Wallow Creek, <u>South Fork</u> headwaters - Bear Wallow Creek	AZ15060101-258	Yes: Insufficient monitoring
Bloody Tanks Wash Schultz Ranch - Miami Wash	AZ15060103-034B	Yes: Copper, insufficient monitoring



Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern
Cottonwood Canyon headwaters - Pinto Creek	AZ15060103-891	Yes: Insufficient monitoring
Gold Gulch Canyon headwaters - Pinto Creek	AZ15060103-894	Yes: Insufficient monitoring
Hay Creek headwaters - West Fork Black River	AZ15060101-353	Yes: Insufficient monitoring
Lake Sierra Blanca	AZL15060101-1390	Yes: Fish kill (1998), insufficient monitoring
Miller Springs Canyon headwaters - Pinto Creek	AZ15060103-892	Yes: Selenium, turbidity/suspended sediment concentration, missing core parameters
Pinto Creek, <u>West Fork</u> headwaters - Pinto Creek	AZ15060103-066	Yes: Insufficient monitoring
Reservation Creek headwaters - Black River	AZ15060101-010	Yes: Insufficient monitoring
Salt River Roosevelt Lake - Apache Lake	AZ15060106A-024	Yes: Insufficient monitoring
Snake Creek headwaters - Black River	AZ15060101-045	Yes: Missing core parameters
Stinky Creek Fort Apache Reservation - West Fork Black River	AZ15060101-352A	Yes: Missing core parameters
<b>San Pedro - Willcox Playa - Rio Yaqui Watershed</b>		
Aravaipa Creek Wildemess Area - San Pedro River	AZ15050203-004C	Yes: Missing core parameters
Bass Canyon, <u>unnamed tributary of</u> headwaters - Bass Canyon Creek	AZ15050203-935	Yes: Insufficient monitoring
C Canyon headwaters - Mule Gulch	AZ15080301-342	Yes: Insufficient monitoring
Dubacher Canyon headwaters - Mule Gulch	AZ15080301-075	Yes: Insufficient monitoring
Grant Creek headwaters - trib at 32 38°09"/109 56°35"	AZ15050201-033A	Yes: Insufficient monitoring
Hendricks Gulch headwaters - Mule Gulch	AZ15080301-335	Yes: Insufficient monitoring
Leslie Canyon Creek headwaters - Whitewater Draw	AZ15080301-007	Yes: Insufficient monitoring
Miller Canyon Creek headwaters - San Pedro River	AZ15050202-409A	Yes: Insufficient monitoring



Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern
Morales Creek headwaters - Mule Gulch	AZ15080301-331	Yes: Insufficient monitoring
Mule Gulch Highway 80 bridge - Whitewater Draw	AZ15080301-090D	Yes: Copper exceedance and insufficient monitoring
Mural and Grassy Hill tributary headwaters - Mule Gulch	AZ15080301-334	Yes: Insufficient monitoring
OK and Youngblood tributary headwaters - Brewery Gulch	AZ15080301-1000	Yes: Insufficient monitoring
Riggs Flat Lake	AZL15050201-1210	Yes: Turbidity, insufficient monitoring
Snow Flat Lake	AZL15050201-1420	Yes: Insufficient monitoring
Spring Canyon Creek headwaters - Mule Gulch	AZ15080301-333	Yes: Insufficient monitoring
Twin Pond	AZL15080302-0001	Yes: Insufficient monitoring
Ward Canyon Creek headwaters - Turkey Creek	AZ15050201-433	Yes: Insufficient monitoring
Whitewater Draw Gadwell Canyon - unnamed tributary (15080301-003)	AZ15080301-004	Yes: Lead, insufficient monitoring
Whitewater unnamed tributary (15080301-003) - unnamed tributary at 31 20'36"/109 34'46"	AZ15080301-002A	Yes: Lead, zinc, insufficient monitoring
Winwood Canyon headwaters - Mule Gulch	AZ15080301-340	Yes: Insufficient monitoring
<b>Santa Cruz - Rio Magdalena - Rio Sonoyta</b>		
Chimenea Creek headwaters - Rincon Creek	AZ15050302-140	Yes: Insufficient monitoring
Loma Verde Wash headwaters - unnamed tributary to Tanque Verde Wash	AZ15050302-268	Yes: Insufficient monitoring
Madera Canyon Creek headwaters - tributary at 31 43'42" / 110 52'50"	AZ15050301-322A	Yes: Insufficient monitoring
Madrona Creek headwaters - Rincon Creek	AZ15050302-138	Yes: Insufficient monitoring
Pena Blanca Canyon Creek Mexico border - Pena Blanca Lake	AZ15050301-808	Yes: Insufficient monitoring
Potrero Creek Interstate 19 - Santa Cruz River	AZ15050301-500B	Yes: Chlorine, copper, nitrifying core parameters

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern
Santa Cruz River Roger Road WWTP outfall - Rillito Creek	AZ15050301-003B	Yes: Missing core parameters
Santa Cruz River HUC boundary 15050303 - Baumgartner Road	AZ15050303-005A	Yes: Missing core parameters
Sonoita Creek headwaters - Patagonia WWTP	AZ15050301-013A	Yes: Insufficient monitoring
Sycamore Canyon Creek headwaters - Mexico border	AZ15080200-002	Yes: Insufficient monitoring
<b>Upper Gila Watershed</b>		
Cave Creek, <u>North Fork</u> headwaters - Cave Creek	AZ15040006-856	Yes: Insufficient monitoring
Cluff Pond #3	AZL15040005-0370	Yes: Insufficient monitoring
East Turkey Creek headwaters - unnamed tributary at 31°58'22"/109°12'17"	AZ15040006-837A	Yes: Insufficient monitoring
Gila River San Francisco River - Eagle Creek	AZ15040005-024	Yes: Turbidity/suspended sediment concentration, insufficient monitoring
Gila River Eagle Creek - Bonita Creek	AZ15040005-023	Yes: Turbidity/suspended sediment concentration, insufficient monitoring
Turkey Creek headwaters - Campbell Blue Creek	AZ15040004-060	Yes: Missing core parameters
<b>Verde Watershed</b>		
Apache Creek headwaters - Walnut Creek	AZ15060201-019	Yes: Insufficient monitoring
Beaver Creek Dry Beaver Creek - Verde River	AZ15060202-002	Yes: Turbidity/suspended sediment concentration, missing core parameters
Bitter Creek Jerome WWTP - 2.5 miles below wastewater treatment plant	AZ15060202-066B	Yes: Insufficient monitoring
Bitter Creek, <u>unnamed tributary of</u> headwaters - Bitter Creek	AZ15060202-868	Yes: Cadmium, copper, pH (low), zinc, insufficient monitoring
Camp Creek headwaters - Verde River	AZ15060203-031	Yes: Insufficient monitoring
Colony Wash headwaters - Fort McDowell Indian Reservation	AZ15060203-998	Yes: Insufficient monitoring
East Verde River headwaters - Ellison Creek	AZ15060203-021A	Yes: Turbidity/suspended sediment concentration, insufficient monitoring



Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern
Ellison Creek headwaters - East Verde River	AZ15060203-459	Yes: Insufficient monitoring
Fossil Creek headwaters - Verde River	AZ15060203-024	Yes: Insufficient monitoring
Fountain Lake	AZL15060203-0003	Yes: Insufficient monitoring
Granite Creek headwaters - Willow Creek	AZ15060202-059A	Yes: <i>Escherichia coli</i> , dissolved oxygen, mercury, turbidity/suspended sediment concentration, missing core parameters
Green Valley Lake	AZL15060203-0015	Yes: Insufficient monitoring
Horseshoe Reservoir	AZL15060203-0620	Yes: Turbidity, missing core parameters
Munds Creek headwaters - Oak Creek	AZ15060202-415	Yes: Missing core parameters, insufficient seasonal coverage
Oak Creek headwaters - West Fork Oak Creek	AZ15060202-019	Yes: Turbidity/suspended sediment concentration, missing core parameters
Oak Creek Dry Creek - Spring Creek	AZ15060202-017	Yes: Insufficient monitoring
Oak Creek Spring Creek - Verde River	AZ15060202-016	Yes: Insufficient monitoring
Oak Creek, West Fork headwaters - Oak Creek	AZ15060202-020	Yes: Insufficient monitoring
Perkins Tank	AZL15060202-1080	Yes: Dissolved oxygen, turbidity, insufficient monitoring
Pine Creek headwaters - unnamed tributary at 34 21°51'N/111 26°46'	AZ15060203-049A	Yes: Insufficient monitoring
Pine Creek unnamed tributary at 34 21°51'N/111 26°46' - East Verde River	AZ15060203-049B	Yes: Insufficient monitoring
Roundtree Canyon Creek headwaters - Tangle Creek	AZ15060203-853	Yes: Insufficient monitoring
Scholze Lake	AZL15060202-1350	Yes: Dissolved oxygen, lead, nitrogen, turbidity, missing core parameters
Spring Creek Coffee Creek - Oak Creek	AZ15060202-022	Yes: Insufficient monitoring
Stehr Lake	AZL15060203-1480	Yes: Insufficient monitoring
Sullivan Lake	AZL15060202-3370	Yes: pH (high), insufficient monitoring
Sycamore Creek Cedar Creek - Verde River	AZ15060202-026	Yes: Insufficient monitoring
Sycamore Creek headwaters - Verde River	AZ15060203-055	Yes: Insufficient monitoring

Surface Water	Reach or Lake Number	On the 2004 Planning List Pollutants or Parameters of Concern
Verde River Granite Creek - Hell Canyon	AZ15060202-052	Yes: Insufficient monitoring
Verde River Hell Canyon - unnamed reach number 15060202-065	AZ15060202-038	Yes: Insufficient monitoring
Verde River Sycamore Creek - Salt River	AZ15060203-001	Yes: Insufficient monitoring events
Watson Lake	AZL15060202-1590	Yes: Dissolved oxygen, pH (high), nitrogen, fish kill, missing core parameters
Webber Creek headwaters - East Verde River	AZ15060203-058	Yes: Insufficient monitoring
West Clear Creek Meadow Canyon - Verde River	AZ15060203-026B	Yes: Missing core parameters
Wet Beaver Creek Long Canyon - Rarick Canyon	AZ15060202-004	Yes: Missing core parameters
Wet Beaver Creek Rarick Canyon - Dry Beaver Creek	AZ15060202-003	Yes: Insufficient monitoring
Wet Bottom Creek headwaters - Verde River	AZ15060203-020	Yes: Insufficient monitoring



**Table 28. Category 2 -- Attaining Some Uses**

At least One Designated Use Assessed as "Attaining" and All Others are "Inconclusive"  
All Waters are On the Planning List for Follow Up Monitoring

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern
<b>Bill Williams Watershed</b>		
Big Sandy River Sycamore Creek - Burro Creek	AZ15030201-004	Yes: Selenium
Bill Williams River Point B - Colorado River	AZ15030204-001	Yes: Turbidity/suspended sediment concentration, missing core parameters
Boulder Creek unnamed wash at 34 41'14"/113 Q3'34" - Wilder Creek	AZ15030202-006B	Yes: Copper, mercury, zinc, missing core parameters
Boulder Creek Copper Creek - Burro Creek	AZ15030202-005B	Yes: Mercury, selenium, missing core parameters
Burro Creek Francis Creek - Boulder Creek	AZ15030202-008	Yes: Copper, mercury, missing core parameters
Burro Creek Boulder Creek - Black Canyon	AZ15030202-004	Yes: Mercury
Santa Maria River Bridle Wash - Date Creek	AZ15030203-009	Yes: <i>Escherichia coli</i>
<b>Colorado - Grand Canyon Watershed</b>		
Colorado River Lake Powell - Paria River	AZ14070006-001	Yes: Missing core parameters
Dogtown Reservoir	AZL15010004-0480	Yes: Selenium, dissolved oxygen, pH (high), turbidity, missing core parameters
<b>Colorado - Lower Gila Watershed</b>		
Colorado River Bill Williams River - Osborne Wash	AZ15030104-020	Yes: Selenium
Colorado River Indian Wash - Imperial Dam	AZ15030104-001	Yes: Suspended sediment concentration
Colorado River Main Canal - Mexico border	AZ15030107-001	Yes: Suspended sediment concentration, DDE, dieldrin, selenium
Lake Havasu	AZL15030101-0590A	Yes: Mercury, selenium, <i>Escherichia coli</i>
<b>Little Colorado - San Juan Watershed</b>		
Ashurst Lake	AZL15020015-0090	Yes: Turbidity, missing core parameters
Barbershop Canyon Creek headwaters - East Clear Creek	AZ15020008-537	Yes: Missing core parameter

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern
Billy Creek headwaters - Show Low Creek	AZ15020005-019	Yes: Turbidity/suspended sediment concentration, <i>Escherichia coli</i> , missing core parameter
Bear Canyon Lake	AZL15020008-0130	Yes: Dissolved oxygen, pH (low), selenium, missing core parameters
Blue Ridge Reservoir	AZL15020008-0200	Yes: Dissolved oxygen, missing core parameters
Chevelon Creek Black Canyon - Little Colorado River	AZ15020010-001	Yes: Turbidity/suspended sediment concentration
Clear Creek Reservoir	AZL15020008-0340	Yes: Dissolved oxygen, missing core parameters
Colter Creek headwaters - Nutrioso Creek	AZ15020001-293	Yes: Missing core parameter
East Clear Creek headwaters - Yeager Canyon	AZ15020008-009	Yes: Dissolved oxygen, missing core parameter
Kinnikinnick Lake	AZL15020015-0730	Yes: Turbidity/suspended sediment concentration, selenium, missing core parameters
Lee Valley Reservoir	AZL15020001-0770	Yes: Missing core parameters
Little Colorado River, <u>East Fork</u> headwaters - Hall Creek	AZ15020001-230	Yes: Missing core parameters
Little Colorado River, <u>West Fork</u> headwaters - Government Springs	AZ15020001-013A	Yes: Missing core parameters
Little Colorado River, <u>West Fork</u> Government Springs - Little Colorado River	AZ15020001-013B	Yes: Copper, missing core parameters
Mineral Creek headwaters - Concho Creek	AZ15020002-648	Yes: Dissolved oxygen, missing core parameter
Rio de Flag Flagstaff WWTP - San Francisco Wash	AZ15020015-004B	Yes: Turbidity/suspended sediment concentration
Show Low Creek headwaters - Linden Wash	AZ15020005-012	Yes: Turbidity/suspended sediment concentration
Silver Creek headwaters - Show Low Creek	AZ15020005-013	Yes: Dissolved oxygen, turbidity/suspended sediment concentration, missing core parameter
Woods Canyon Lake	AZL15020010-1700	Yes: Missing core parameters
<b>Middle Gila Watershed</b>		
Gila River San Pedro River - Mineral Creek	AZ15050100-008	Yes: Turbidity/suspended sediment concentration
Hassayampa River Copper Creek - Blind Indian Creek	AZ15070103-007B	Yes: <i>Escherichia coli</i> , cadmium
Hassayampa River Sols Wash - 8 miles below Wickenburg	AZ15070103-002A	Yes: <i>Escherichia coli</i>



Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern
Lake Pleasant	AZL15070102-1100	Yes: Ammonia, selenium, missing core parameter
Lynx Lake	AZL15070102-0860	Yes: Lead, manganese, missing core parameters
Papago Park Ponds	AZL15060106B-1030	Yes: Missing core parameters
<b>Salt River Watershed</b>		
Apache Lake	AZL15060106A-0070	Yes: Dissolved oxygen, missing core parameters
Bear Wallow Creek North and South Forks - Black River	AZ15060101-023	Yes: Missing core parameters
Beaver Creek headwaters - Black River	AZ15060101-008	Yes: Turbidity/suspended sediment concentration, missing core parameter
Big Lake	AZL15060101-0160	Yes: Dissolved oxygen, missing core parameters
Black River Beaver Creek - Reservation Creek	AZ15060101-007	Yes: Missing core parameters
Black River, <u>East Fork</u> headwaters - Black River	AZ15060101-009	Yes: Missing core parameter
Black River, <u>West Fork</u> headwaters - Black River East Fork	AZ15060101-048	Yes: Missing core parameters
Canyon Creek headwaters - White Mountain Apache Reservation	AZ15060103-014	Yes: Fish kill due to fire (2002)
Fish Creek headwaters - Black River	AZ15060101-032	Yes: Copper, missing core parameters
Roosevelt Lake	AZL15060103-1240	Yes: Turbidity/suspended sediment concentration, missing core parameters
Rye Creek headwaters - Tonto Creek	AZ15060105-014	Yes: Missing core parameter
Saguaro Lake	AZL15060106A-1290	Yes: Missing core parameters
Salt River Pinal Creek - Roosevelt Lake	AZ15060103-004	Yes: <i>Escherichia coli</i> , total nitrogen, turbidity/suspended sediment concentration
Spring Creek headwaters - Tonto Creek	AZ15060105-010	Yes: Missing core parameter
Tonto Creek headwaters - unnamed tributary at 34 18°10'/111 Q4°14"	AZ15060105-013A	Yes: Turbidity/suspended sediment concentration, <i>Escherichia coli</i> , nitrogen (annual mean)
Tonto Creek unnamed tributary at 34 18°10'/111 Q4°14" - Haigler Creek	AZ15060105-013B	Yes: Turbidity/suspended sediment concentration, <i>Escherichia coli</i> , nitrogen (annual mean)
<b>San Pedro - Willcox Playa - Rio Yaqui Watershed</b>		

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern
Copper Creek headwaters - Prospect Canyon	AZ15050203-022A	Yes: Selenium
Double R Canyon Creek headwaters - Bass Canyon Creek	AZ15050203-902	Yes: Missing core parameter
Ramsey Canyon Creek headwaters - Forest Road 110	AZ15050202-404A	Yes: Missing core parameter
San Pedro River Charleston - Walnut Gulch	AZ15050202-006	Yes: Turbidity/suspended sediment concentration
San Pedro River Hot Springs Creek - Redfield Canyon	AZ15050203-011	Yes: <i>Escherichia coli</i> , turbidity/suspended sediment concentration
Whitewater Draw Unnamed trib. at 31 20'36"/109 34'46" - Mexico border	AZ15080301-002B	Yes: Lead, missing core parameters
<b>Santa Cruz - Rio Magdalena - Rio Sonoyta</b>		
Cienega Creek headwaters - Gardner Canyon	AZ15050302-006A	Yes: Missing core parameter
Cienega Creek Gardner Canyon - USGS gage (Pantano Wash)	AZ15050302-006B	Yes: Missing core parameter
Kennedy Lake	AZL15050301-0720	Yes: Missing core parameters
Parker Canyon Lake	AZL15050301-1040	Yes: Missing core parameters, mercury in fish tissue (2002)
Patagonia Lake	AZL15050301-1050	Yes: Missing core parameters
Rose Canyon Lake	AZL15050302-1260	Yes: pH (low and high), turbidity, missing core parameters
Sabino Canyon Creek tributary at 32 23'28"/110 47'00" - Tanque Verde Wash	AZ15050302-014B	Yes: Missing core parameters
Santa Cruz River Nogales WWTF - Josephine Canyon	AZ15050301-009	Yes: Missing core parameters
Santa Cruz River Josephine Canyon - Tubac Bridge	AZ15050301-008A	Yes: Turbidity/suspended sediment concentration, chlorine, missing core parameters
Santa Cruz River Tubac Bridge - Soporí Wash	AZ15050301-008B	Yes: Missing core parameters
Santa Cruz River Canada del Oro - HUC boundary 15050303	AZ15050301-001	Yes: Chlorine
<b>Upper Gila Watershed</b>		
Ash Creek tributary at 32 45'37"/109 52'22" - Gila River	AZ15040005-040B	Yes: Missing core parameters



Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern
Blue River New Mexico border - KP Creek	AZ15040004-026	Yes: Missing core parameters
Blue River KP Creek - Strayhorse Creek	AZ15040004-025A	Yes: Missing core parameters
Campbell Blue Creek headwaters - Blue River	AZ15040004-028	Yes: Missing core parameter
Cave Creek South Fork of Cave Creek - USFS boundary	AZ15040006-852B	Yes: Turbidity/suspended sediment concentration
Cave Creek, South Fork headwaters - Cave Creek	AZ15040006-849	Yes: <i>Escherichia coli</i>
Dankworth Ponds	AZL15040005-0440	Yes: Selenium, turbidity, missing core parameters
Eagle Creek headwaters - unnamed tributary at 33° 23'24" / 109° 29'35"	AZ15040006-028A	Yes: Missing core parameters
Frye Canyon Creek headwaters - Frey Mesa Reservoir	AZ15040005-988A	Yes: Missing core parameters
Gila River New Mexico border - Bitter Creek	AZ15040002-004	Yes: Selenium
KP Creek headwaters - Blue River	AZ15040004-029	Yes: Missing core parameters
Roper Lake	AZL15040006-1250	Yes: Missing core parameter
San Francisco River headwaters - New Mexico border	AZ15040004-023	Yes: Turbidity/suspended sediment concentration
San Francisco River New Mexico border - Blue River	AZ15040004-004	Yes: Turbidity/suspended sediment concentration
San Francisco River Blue River - Limestone Gulch	AZ15040004-003	Yes: <i>Escherichia coli</i>
San Francisco River Limestone Gulch - Gila River	AZ15040004-001	Yes: Turbidity/suspended sediment concentration, copper, <i>Escherichia coli</i>
<b>Verde Watershed</b>		
Bartlett Lake	AZL15060203-0110	Yes: Missing core parameters
Granite Basin Lake	AZL15060202-0580	Yes: pH, ammonia, missing core parameters
East Verde River American Gulch - Verde River	AZ15060203-022C	Yes: Boron
J.D. Lam Lake	AZL15060202-0700	Yes: pH (low), missing core parameters

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern
Pumphouse Wash headwaters - Oak Creek	AZ15060202-442	Yes: Missing core parameters
Verde River Sycamore Creek - Oak Creek	AZ15060202-025	Yes: Mercury, <i>Escherichia coli</i>
Verde River HUC boundary 15060203 - West Clear Creek	AZ15060203-027	Yes: <i>Escherichia coli</i> , missing core parameters
Verde River Tangle Creek - Ister Flat	AZ15060203-018	Yes: Turbidity/SSC, <i>Escherichia coli</i>
Verde River Horseshoe Dam - Alder Creek	AZ15060203-008	Yes: Missing core parameters
Verde River Camp Creek - Sycamore Creek	AZ15060203-003	Yes: Missing core parameters



*An ADEQ staff member prepares to sample Sabino Canyon Creek, a Category 2 surface water, near Tucson, Arizona. It is attaining some uses, but was placed on the Planning List due to lack of sufficient data to make a full assessment.*



**Table 29. Category 1 -- Attaining All Uses**

All Designated Uses are Assessed as "Attaining"

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern
<b>Bill Williams Watershed</b>		
Trout Creek Cow Creek - Knight Creek	AZ15030201-014	No
<b>Colorado - Grand Canyon Watershed</b> (no Category 1 waters)		
<b>Colorado - Lower Gila Watershed</b> (no Category 1 waters)		
<b>Little Colorado - San Juan Watershed</b> (no Category 1 waters)		
<b>Middle Gila Watershed</b>		
Agua Fria River Sycamore Creek - Big Bug Creek	AZ15070102-023	No
Agua Fria River Little Squaw Creek - Cottonwood Creek	AZ15070102-017	No
Arnett Creek headwaters - Queen Creek	AZ15050100-1818	No
Cave Creek headwaters - Cave Creek Dam	AZ15060106B-026A	No
Hassayampa River Cottonwood Creek - Martinez Wash	AZ15070103-004	No
Sycamore Creek Tank Canyon - Agua Fria River	AZ15070102-024B	No
Tempe Town Lake	AZL15060106B-1588	No
<b>Salt River Watershed</b>		
Campaign Creek headwaters - Pinto Creek	AZ15060103-037	No
Cherry Creek tributary at 34 Q5'09"/110 56'04" - Salt River	AZ15060103-015B	No
Coon Creek Unnamed tributary at 33 46'42"/110 54'25" - Salt River	AZ15060103-039B	No
Deer Creek headwaters - Rye Creek	AZ15060105-018	No
Greenback Creek headwaters - Tonto Creek	AZ15060105-005	No

Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern
Haigler Creek headwaters - unnamed reach at 34 12'23.1"/111 0'11"	AZ15060105-012A	No
Haunted Canyon headwaters - Pinto Creek	AZ15060103-879	No
Pinal Creek Jesse Lane - Salt River	AZ15060103-280D	No
Tonto Creek Rye Creek - Gun Creek	AZ15060105-008	No
<b>San Pedro - Willcox Playa - Rio Yaqui Watershed</b>		
Aravaipa Creek Stowe Gulch - Wildemess Area	AZ15050203-004B	No
Bass Canyon Creek tributary at 32 26'06"/110 13'18" - Hot Springs Canyon Creek	AZ15050203-899B	No
Buehman Canyon headwaters - end of Unique Waters	AZ15050203-010A	No
Hot Springs Canyon Creek headwaters - San Pedro River	AZ15050203-013	No
Rucker Canyon Creek headwaters - Whitewater Draw	AZ15080301-288	No
<b>Santa Cruz - Rio Magdalena - Rio Sonoyta</b>		
Redrock Canyon Creek headwaters - Harshaw Creek	AZ15050301-576	No
Santa Cruz River headwaters - Mexico border	AZ15050301-268	No
<b>Upper Gila Watershed</b>		
Blue River Strayhorse Creek - San Francisco River	AZ15040004-025B	No
Bonita Creek Park Creek - Gila River	AZ15040005-030	No
Eagle Creek Willow Creek - Sheep Wash	AZ15040005-027	No
Eagle Creek Sheep Wash - Gila River	AZ15040005-025	No



Surface Water	Reach or Lake Number	On 2004 Planning List Pollutants or Parameters of Concern
<b>Verde Watershed</b>		
Oak Creek Below Slide Rock State Park - Dry Creek	AZ15060202-018C	No
Verde River Unnamed reach 15060202-065 - Railroad Draw	AZ15060202-037	No



*This reach of Trout Creek, near Wikieup, Arizona, was placed in Category 1 because it is attaining all designated uses.*



## What will Arizona be removing from its 2002 303(d) List?

The parameters of concern being removed from the 2002 303(d) List and the reason for their removal were detailed in the assessment tables in Chapter IV. The following list (Table 30) provides a delist summary, showing a total of 58 parameters delisted from 31 streams and three lakes. Most of these changes were due to completion of a TMDL (23 parameters) or due to a change in water quality standards (25 parameters).

At least one of the following criteria for delisting a pollutant or reach is shown in **Table 30**, as established in the Impaired Water Identification Rule (Appendix B) (R18-11-605.E.2 and R18-11-604.B):

### Criteria Number

1. EPA-approved TMDL has been developed for the pollutant;
2. New data indicate that the water quality standard is being met;
3. Change in the standard or designated use, results in the water quality standard is no longer being exceeded;
4. Reevaluation of the assessment information indicates an error or deficiency in the original analysis resulted in an inappropriate listing;
5. Pollutant loadings from naturally occurring conditions alone are sufficient to cause a violation of the water quality standard;
6. Reach is split and no current or historic data exists in this portion of the reach that would support a listing.

**Table 30. Pollutants and Surface Waters Removed From 2002 303(d) List**

Surface Water	Reach or Lake Number	Pollutant of Concern Removed From List	Criteria For Delist	Delist Surface Water
Bill Williams Watershed				
Alamo Lake	AZL15030204-0040	Low dissolved oxygen	2 - Current data indicates uses are being attained.	No. Remains on list due to ammonia, mercury in fish tissue, and high pH.
		Sulfide	3 - Change in standard. Data shows that new standard is attained.	
Boulder Creek unnamed wash at 34 41'14"/113 Q3'34" - Wilder Creek	AZ15030202-006B	Fluoride	3 - Change in standard. Data shows that new standard is attained.	No. Remains on list due to mercury.
Colorado - Grand Canyon Watershed				
Colorado River Parashant - Diamond Creek	AZ15010002-003	Turbidity	3 - Change in standard. Moved to the Planning List.	No. Remains on the list due to selenium and suspended sediment concentration.
Virgin River Beaver Dam Wash - Big Bend Wash	AZ15010010-003	Fecal coliform	3 - Change in standard. <i>Escherichia coli</i> standard is being attained.	No. Remains on the list due to selenium and suspended sediment concentration.
		Turbidity	3 - Change in standard. Moved to the Planning List.	
Colorado - Lower Gila Watershed				
Painted Rock Borrow Pit Lake	AZ15070201-1010	Fecal coliform	3 - Change in standard. Moved to the Planning List for <i>Escherichia coli</i> monitoring (new standard).	No. Remains on list due to fish consumption advisory (DDT metabolites, toxaphene and chlordane in fish), and low dissolved oxygen.



Surface Water	Reach or Lake Number	Pollutant of Concern Removed From List	Criteria For Delist	Delist Surface Water
Little Colorado - San Juan Watershed				
Little Colorado River Water Canyon Creek - Nutrioso Creek	AZ15020001-010	Turbidity	1 - TMDL approved in 2002. Moved to the Planning List.	Yes.
Little Colorado River Nutrioso Creek - Camero Wash	AZ15020001-009	Turbidity	1 - TMDL approved in 2002. Moved to the Planning List.	Yes.
Middle Gila Watershed				
French Gulch headwaters - Hassayampa River	AZ15070103-239	Manganese	3 - Change in standard. Data shows that new standard is attained.	No. Remains on list due to cadmium, copper and zinc.
Gila River Centennial Wash - Gillespie Dam	AZ15070101-008	Turbidity	3 - Change in standard. Moved to the Planning List.	No. Remains on list due to fish consumption advisory (DDT metabolites, toxaphene and chlordane in fish), boron, and selenium.
Hassayampa River headwaters - Copper Creek	AZ15070103-007A	Zinc	1 - TMDLs for cadmium, copper, and zinc approved in 2002. (Cadmium and copper were delisted in 2002; however, TMDLs had already been drafted.) Moved to the Planning list.	Yes.
Mineral Creek Devils Canyon - Gila River	AZ15050100-012B	Beryllium	3 - Change in standard. Data shows that new standard is attained.	No. Remains on list due to copper and selenium.
		pH	2 - Current data indicates uses are being attained. (Remediation activities removing contaminants.)	
		Zinc	2 - Current data indicates uses are being attained. (Remediation activities removing contaminants.)	
Turkey Creek headwaters - tributary at 34 18°28'112 21°28"	AZ15070102-036A	Cadmium	6 - Reach was split in 2002 due to changes in designated uses at 5000-foot elevation. All exceedances that resulted in a listing occurred in the lower reach (AZ15070102-036B).	Yes.
		Copper		
		Zinc		
Salt River Watershed				
Christopher Creek headwaters - Tonto Creek	AZ15060105-353	Turbidity	3 - Change in standard. Moved to Planning List.	No. Remains on list due to <i>Escherichia coli</i> .
Tonto Creek headwaters - unnamed tributary at 34 18°10'111 04°14"	AZ15060105-013A	Turbidity	3 - Change in standard. Moved to Planning List.	Yes.
Tonto Creek unnamed tributary at 34 18°10'111 04°14" - Haigler Creek	AZ15060105-013B	Turbidity	3 - Change in standard. Moved to Planning List.	Yes.
Tonto Creek Rye Creek - Gun Creek	AZ15060105-008	Turbidity	3 - Change in standard 2 - Current data shows no exceedances in 18 samples.	Yes.

Surface Water	Reach or Lake Number	Pollutant of Concern Removed From List	Criteria For Delist	Delist Surface Water
San Pedro - Willcox Playa - Rio Yaqui Watershed				
Mule Gulch headwaters - above Lavender Pit	AZ15080301-090A	pH	2. Current data shows low pH in only 1 of 10 samples, and no zinc exceedances in 15 samples.	No. Remains on the list due to copper.
		Zinc		
Santa Cruz - Rio Magdalena - Rio Sonoyta				
Alum Gulch headwaters - 31 28°20'/110 43°51"	AZ15050301-561A	Cadmium	1 - TMDLs approved in 2003. Moved to the Planning List.	Yes.
		Copper		
		pH		
		Zinc		
Alum Gulch 31 28°20'/110 43°51" - 31 29°17'/110 44°25"	AZ15050301-561B	Cadmium	1 - TMDLs approved in 2003. Moved to the Planning List.	Yes.
		Copper		
		pH		
		Zinc		
Harshaw Creek headwaters - Sonoita Creek	AZ15050301-025	Zinc	3 - Designated use changed from A&Ww to A&We. Zinc data meet new ephemeral standards.	Yes.
Nogales and East Nogales Washes Mexico border - Potrero Creek	AZ15050301-011	Fecal coliform	2 - Change in standard. Now listed due to <i>Escherichia coli</i> exceedances.	No. Remains on list due to ammonia, chlorine, copper, and <i>Eshcerichia coli</i> .
		Turbidity	3 - Change in standard. Moved to Planning List.	
Potrero Creek Interstate 19 - Santa Cruz River	AZ15050301-500B	Fecal coliform	3 - Change in standard. Meeting new <i>Escherichia coli</i> standards. (No exceedance in 15 samples.)	Yes.
Santa Cruz River Mexico border - Nogales WWTP	AZ15050301-010	Fecal coliform	3 - Change in standard. Now listed due to <i>Escherichia coli</i> exceedances.	No. Remains on list due to <i>Eshcerichia coli</i> .
Santa Cruz River Nogales WWTP - Josephine Canyon	AZ15050301-009	Fecal coliform	3 - Change in standard. Meeting new <i>Escherichia coli</i> standards. (No exceedance in 15 samples.)	Yes.
Santa Cruz River Josephine Canyon - Tubac Bridge	AZ15050301-008A	Faecal coliform	3 - Change in standard. Meeting new <i>Escherichia coli</i> standards. (No exceedance in 16 samples.)	Yes.
		Turbidity	3 - Change in standard. Moved to the Planning List.	
Santa Cruz River Tubac Bridge - Sopori Wash	AZ15050301-008B	Fecal coliform	3 - Change in standard. Meeting new <i>Escherichia coli</i> standards. (No exceedance in 17 samples.)	Yes.
Three R Canyon headwaters - 31 28°35'/110 46°19"	AZ15050301-558A	Cadmium	1 - TMDLs approved in 2003. Moved to the Planning List.	Yes.
		Copper		
		pH		



Surface Water	Reach or Lake Number	Pollutant of Concern Removed From List	Criteria For Delist	Delist Surface Water
		Zinc		
Three R Canyon 31 28°35'110 46°19'-31 28°27'110 47°12"	AZ15050301-558B	Cadmium	1 - TMDLs approved in 2003. Moved to the Planning List.	Yes.
		Copper		
		pH		
		Zinc		
Three R Canyon 31 28°27'110 47°12" - Sonoita Creek	AZ15050301-558C	Cadmium	1 - TMDLs approved in 2003. Moved to the Planning List.	Yes.
		Copper		
		pH		
		Zinc		
Upper Gila Watershed				
Gila River Bonita Creek - Yuma Wash	AZ15040005-022	Turbidity	3 - Change in standard. Moved to the Planning List.	No. Remains on list due to <i>Escherichia coli</i> .
San Francisco River Limestone Gulch - Gila River	AZ15040004-001	Turbidity	3 - Change in standard. Moved to the Planning List.	Yes.
Verde Watershed				
Beaver Creek Dry Beaver Creek - Verde River	AZ15060202-002	Turbidity	3 - Change in standard. Moved to the Planning List.	Yes.
Granite Basin Lake	AZL15060202-0580	Dissolved oxygen	5 - Low dissolved oxygen due to natural conditions only (lake turnover).	Yes.
Oak Creek Below Slide Rock State Park - Dry Creek	AZ15060202-018B	Turbidity	3 - Designated use changed from A&Wc to A&Ww because reach is below 5000-foot elevation. Current and historic turbidity data would meet former turbidity standard for A&Ww.	Yes.



## Which TMDLs will ADEQ do next?

**Priority Ranking and Scheduling TMDLs** – The Clean Water Act and federal regulations (40 CFR 130.7) require the state to establish a priority ranking for each surface water on the 303(d) List. The criteria for this ranking and which TMDLs will be targeted for initiation within the next two years is established in the Impaired Waters Rule (R18-11-606) (**Appendix B**). Arizona's ranking system reflects the relative value and benefits of each surface water to the state and considers, among other factors:

- The severity of the impairment in relation to the designated uses, especially threats to human health, aquatic life and wildlife;
- Surface waters where endangered or threatened species exist and the pollutant is likely to further jeopardize the listed species;
- Other pertinent information such as: economic or aesthetic importance, the complexity of the TMDL, degree of public interest, permitting issues, an impending change in water quality standard or designated use, and date when the surface water was first placed on the 303(d) List.

Specific factors considered in prioritizing and scheduling impaired surface waters for TMDL development are listed as footnotes at the end of **Table 31**. As a surface water may have a mixture of high, medium, and low priority factors, the final priority ranking considers all factors but weighs some factors more heavily than others. The TMDL schedule in **Table 31** also indicates which factors were applied, which were weighed more heavily, and a brief discussion of the final priority ranking determination.

In general, the surface water was automatically listed as high priority, and ADEQ will initiate development of the associated TMDL within two years following EPA's approval of the 303(d) List, if there is a substantial threat to health and safety of humans, aquatic life, or wildlife. This determination was based on the following four factors:

- The magnitude of the exceedance. For example, the laboratory result was more than twice the standard.
- The duration or persistence of the problem. For example, more than half the samples exceeded standards.
- The standard was established to protect human health or wildlife from imminent harm. For example, the acute toxic Aquatic and Wildlife standards were established based on short-term exposures rather than long-term or life-time exposures.
- A Threatened or Endangered species may be further jeopardized by the

water quality problem. This was determined by using the following information provided by the Arizona Game and Fish Department and the US Fish and Wildlife Service:

A federally-protected Threatened or Endangered species has been confirmed within a mile of the surface water listed or the surface water is within "critical habitat" established for the species;

A standard to protect aquatic and wildlife has been exceeded, and

Published reasons for decline and vulnerability of the species or other published reports indicate that the pollutant or source of the exceedance may further jeopardize this species.

Some low priority factors take precedence over high priority factors when completing a TMDL at this time would either not be appropriate, be premature, or be an inefficient use of resources. These factors included:

- ADEQ has formally submitted to EPA a proposal to delist the surface water or pollutant.
- ADEQ has adopted a new surface water quality standard or designated use that is currently being reviewed by EPA for approval. When approved, the standard would no longer be violated.
- The surface water is expected to attain surface water quality standards before the next listing cycle due to:
  - Recently instituted treatment levels or best management practices in the drainage area,
  - Discharges or activities related to the impairment have ceased, or
  - Actions have been taken and the controls are in place or firmly scheduled for implementation that are likely to bring the surface water back into compliance.
- The water quality problem can be resolved only through the cooperative actions of an agency outside the state or federal jurisdiction (e.g., Mexico, another state, or Indian reservation).

EPA may also revise this schedule during its review process. Or it may become necessary to shift priority ranking of a surface water due to significant changes in resources to complete TMDLs or new information obtained concerning one of the priority factors. Such changes would be negotiated with EPA and would be made known to the public through the TMDL status page on ADEQ's web site: [www.azdeq.gov](http://www.azdeq.gov).



**Table 31. TMDL Priority Ranking and Schedule**

(Based on ADEQ submittal to EPA for approval in August 2004)  
(See key to priority factors on p. 46)

Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE **	
Bill Williams Watershed																												
Alamo Lake 1,414 acres AZL15030204-0040	Mercury (In fish tissue)	1998 (2002 EPA)	H 1			H 4			H 7						M 5	M 6						L 6					High priority	Initiated monitoring and investigation in 2003. Initiate TMDL in 2004. Complete TMDL in 2005.
	Excess mercury in fish tissue can be toxic to humans and other animals that eat the fish (H1). Fish in this lake are a food source for the bald eagle (a species federally-listed as Threatened) (H4) and the lake supports significant sport fishing (H7). ADEQ will be coordinating research for potential mercury sources for the five mercury listings in this watershed as they may have common sources (M5, M6). Currently there is insufficient data to determine sources or critical conditions (L6).																											
	Ammonia	2004							H 7							M 6							L 6				Medium priority	Ongoing monitoring by US Fish and Wildlife Service. Initiate monitoring and investigation in 2007. Initiate TMDL in 2008. Complete TMDL in 2009.
	pH	1996							H 7		M 1					M 6										Medium priority		
ADEQ is currently establishing criteria to classify its lakes which may result in changes in assessment status (M6). Classification is to be completed by 2004. High ammonia and pH levels may indicate eutrophication problems that may lead to fish kills at this popular fishing area (H7). The elevated ammonia and pH should not negatively impact the bald eagles located near this lake (a species that is federally-listed as Threatened). More investigation is needed to determine the source of the pollutants (L6). Although ammonia could pose a significant threat to aquatic life due to its toxic nature, the chronic ammonia standard was exceeded in only 2 of 36 sampling events. The pH level exceeds standard for A&Ww, FBC, and AgL (M1).																												
Boulder Creek Wilder Creek - Copper Creek 3 miles AZ15030202-005A	Arsenic	1988						H 6					M 3		M 5	M 6					L 4	L 5	L 6				High priority	Arsenic, copper and zinc TMDLs are complete and are to be submitted to EPA for approval in 2004.
	Copper	1988	H 1					H 6					M 3		M 5	M 6						L 6						
	Zinc	1988	H 1					H 6					M 3		M 5	M 6						L 6						
	Copper and zinc present a significant threat to wildlife due to the toxic nature of these pollutants and the magnitude of the exceedances as follows: * Dissolved copper results as high as 14,400 µg/L, which is 220 times higher than the standard (H1); * Dissolved zinc results as high as 115,000 µg/L, which is 300 times higher than the standard (H1). Arsenic poses a low human-health threat on this remote intermittent stream which has nominal recreation (L5) (L4). Development of a TMDL has been complex due to intermittent flow, source determination, and correlation of exceedances with storm water runoff (M3, M5, L6). A TMDL has been completed and will be submitted to EPA for approval in 2004 (M6). BLM, Arizona State Land Dept, and private land owners are coordinating efforts to clean up contaminated sites. (Note: Investigations indicate that arsenic impairs the entire reach, while copper and zinc impair the segment between Wilder Creek and Butte Creek, which is below the lower tailings pile.)																											

Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE **		
Colorado-Grand Canyon Watershed																													
Colorado River Parashant Canyon - Diamond Creek 28 miles AZ15010002-003	Selenium	2004													M 5								L 6		L 8		Low priority	Ongoing fixed station monitoring by USGS.	
	Suspended Sediment Concentration	2004													M 5									L 6		L 8		Low priority	Initiate monitoring and investigation in 2010. Initiate TMDL in 2011. Complete TMDL in 2012.
			Prior monitoring and investigations should help support TMDL development; however, further investigation is needed to determine source loadings, especially contributions from natural background (L6, L8). Source contributions from Utah, Colorado, and other upstream states may make completion of this TMDL more complex (M5). Two federally protected species occur in this area, the humpback chub and razorback sucker, but should <u>not</u> be negatively impacted by the suspended sediment or relatively low levels of selenium.																										
Paria River Utah border - Colorado River 29 miles AZ14070007-123	Suspended Sediment Concentration	2004													M 5								L 6		L 8		Low priority	Initiate monitoring and investigation in 2010. Initiate TMDL in 2011. Complete TMDL in 2012.	
			Prior monitoring and investigations in this drainage should help support TMDL development (M6); however, further investigation is needed to determine source loadings, especially contributions from natural background (L6, L8). Source contributions from Utah may make completion of this TMDL more complex (M5).																										
Virgin River Beaver Dam Wash - Big Bend Wash 10 miles AZ15010010-003	Selenium	2004													M 5	<u>M 6</u>							L 6		L 8		Medium priority	Ongoing fixed station monitoring by USGS. Initiate monitoring and investigation in 2009. Initiate TMDL in 2010. Complete TMDL in 2011.	
	Suspended Sediment Concentration	2004													M 5	M 6							L 6		L 8		Medium priority		
			Prior monitoring in this drainage should help support TMDL development (M6); however, further investigation is needed to determine source loadings, especially contributions from natural background (L6, L8). Source contributions from Utah may make completion of this TMDL more complex (M5). Federally protected Virgin River chub and woundfin occur in this area, but should <u>not</u> be negatively impacted by the elevated selenium and suspended sediment concentrations. For efficiency, the development of selenium TMDLs in the Colorado River and the Virgin River will be coordinated (M6).																										
Colorado-Lower Gila Watershed																													
Colorado River Hoover Dam - Lake Mohave 40 miles AZ15030101-015	Selenium	2004				<u>H 4</u>									M 5	M 6							L 6		L 8		High priority	Ongoing fixed station monitoring by USGS. Initiate monitoring and investigation in 2009. Initiate TMDL in 2010. Complete TMDL in 2011.	
			The federally protected Yuma clapper rail occurs in this area and could be negatively impacted by elevated lead or selenium (H4). Prior monitoring in this drainage should help support TMDL development (M6); however, further investigation is needed to determine source loadings, especially contributions from natural background (L6, L8). Note that significant selenium loadings may be contributed from upstream sources in Utah and Colorado and may make completion of the TMDL more complex (M5).																										
Gila River Coyote Wash - Fortuna Wash 28 miles AZ15070201-003	Boron	2004							H 7						M 5	M 6							L 5	L 6			High priority	Ongoing fixed station monitoring. Initiate monitoring and investigation in 2006. Initiate TMDLs in 2007. Complete TMDLs in 2008.	
	Selenium	2004				<u>H 4</u>									M 5	M 6							L 6						
			The federally protected Yuma clapper rail have been found in this surface water and could be negatively impacted by elevated selenium (H4). Elevated selenium and boron may be associated with the extensive agriculture in the area; however, TMDL may be complex due to large number of potential sources and potential seasonal influences (M3, M5, L6). Boron concentrations found may impact downstream agricultural uses (H7) but present a low ecological and human health risk (L5). Coordinate TMDL investigations with boron and selenium investigation upstream, from Centennial Wash to Gillespie Dam (M6).																										



Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE **		
Painted Rocks Borrow Pit Lake 180 acres AZL15070201-1010	Low dissolved oxygen	1992																			L 4	L 5			L 8	Low priority	Lakes classification study will be completed in 2004 and will determine need for TMDL.		
			A 1992 diagnostic feasibility study by ADEQ suggested the causes of low dissolved oxygen were due to design and maintenance problems on this shallow lake and suggested strategies to improve water quality. Drought conditions have reduced lake levels and may be related to some of the low dissolved oxygen readings (L8). During the past year, the lake has been dry and representative water samples at the lake could not be collected (L4). The lake is no longer being stocked with fish and does not have recreational uses because of historic pesticide contamination and fish consumption advisories (L5).																										
	DDT metabolites, toxaphene, chlordane in fish tissue	1988 (EPA 2002)	H 1			H 4										M 5	M 6							L 6			High priority	Initiate monitoring and investigation in 2006. Initiate TMDLs in 2009. Complete TMDLs in 2010.	
			The federally protected Yuma clapper rail occurs in this area and could be negatively impacted by pesticides (H4). There is no public access, thus the public health risk due to fish tissue contamination is significantly reduced; however, these pesticides still present a high risk to aquatic life and species that prey on them (H1). The TMDLs will be complex due to the size of the drainage and potential sources (M5) and will require significant monitoring resources to determine the sources of this historic pesticide (L6). TMDLs will be coordinated with related pesticide TMDLs in the Middle Gila (M6).																										
Little Colorado-San Juan Watershed																													
Little Colorado River Silver Creek - Carr Wash 6 miles AZ15020002-004	Escherichia coli	2004	H 1											M 3		M 5	M 6							L 6			Medium priority	Initiate monitoring and investigation in 2005. Initiate TMDL in 2006. Complete TMDL in 2007.	
			Exceedances of the Escherichia coli standard may represent a significant public health concern if people are swimming or even wading in the water (H1). Exceedances may be related to wet weather events (M3). The drainage area is more than 8,000 square miles so determining the source of contamination may be complex and will require substantial monitoring data to identify sources (M5, L6). ADEQ will initiate this monitoring while it collects data for other TMDLs along the Little Colorado River (M6).																										
Little Colorado River Porter Tank Draw - McDonalds Wash 17 miles AZ15020008-017	Copper	1992	H 1			H 4										M 5							L 6		L 6	High priority	Initiate monitoring and investigation in 2005. Initiate TMDL in 2007. Complete TMDL in 2009.		
	Silver	1992	H 1			H 4										M 5							L 6		L 6				
	Suspended Sediment Concentration	2004														M 5							L 6				Medium priority	Initiate monitoring and investigation in 2005. Initiate TMDL in 2007. Complete TMDL in 2009.	
			Copper and silver TMDLs are a high priority due to the toxic nature of these heavy metals and the frequency of exceedances (9 out of 11 samples exceeded the copper standard, and 2 out of 9 samples exceeded the silver standard) (H1). Little Colorado spinedace, federally protected as a Threatened species, occurs in this reach and may be negatively impacted by the copper and silver (H4), but should not be negatively impacted by the suspended sediment concentration. Data from a USGS study concluded that the metals may be naturally elevated (L6); however, sources and natural loading concentrations need to be further studied (L6). The nature of these pollutants make this study very complex (M5). The current sampling plan for copper and silver will be updated to include SSC.																										
Lake Mary (lower) 660 acres AZL15020015-0890	Mercury (in fish tissue)	2002 (EPA)	H 1						H 7							M 5	M 6							L 6			High priority	ADEQ initiated TMDL monitoring and investigation in 2003. Initiate TMDL in 2005. Complete TMDL in 2006.	
			Fish consumption advisory has been issued. Excess mercury in fish tissue can be toxic to humans and other animals that eat the fish (H1). Normally the lake is a significant public recreational area (H7); however, due to a long drought, the lake has been dry at times during the past year. Intermittent stream flow and drought conditions have slowed collection of adequate data to determine source loadings (L6). Excessive mercury in fish tissue has been found in numerous regional lakes. Because the extent of impairment and sources of loading have not been determined, and may have natural and/or airborne sources, this TMDL is complex and a high priority (M5, M6, L8).																										
Middle Gila Watershed																													



Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE ***	
Alvord Park Lake 27 acres AZL15060106B-0050	Ammonia	2004	H 1						H 7							M 6						L 6					High priority	Initiate monitoring and investigation in 2007. Initiate TMDL in 2008. Complete TMDL in 2009.
	Ammonia poses a significant threat to aquatic life due to its toxic nature (H1). This lake is an important urban recreational area (H7). More investigation is needed to determine the source of the pollutants (L6). ADEQ is currently establishing criteria to classify its lakes which may result in changes in assessment status (M6).																											
Chaparral Lake 13 acres AZL15060106B-0300	Low dissolved oxygen	2004							H 7							M 6						L 6					Medium priority	Initiate monitoring and investigations in 2007. Initiate TMDLs in 2008. Complete TMDLs in 2009.
	Escherichia coli	2004							H 7							M 6						L 6					Medium priority	
	Although exceedances of Escherichia coli standards represent a risk to public health, swimming or wading in the lake is prohibited. Low dissolved oxygen, which may result in fish kills, would be detrimental to this important urban recreational area (H7). More investigation is needed to identify the sources loadings (L6). Both TMDLs in this lake will be developed at the same time for efficiency (M6). ADEQ is currently establishing criteria to classify its lakes which may result in changes in assessment status (M6).																											
Cortez Park Lake 2 acres AZL15060106B-0410	Low dissolved oxygen	2004							H 7		M 1					M 6						L 6					Medium priority	Initiate monitoring and investigations in 2007. Initiate TMDLs in 2008. Complete TMDLs in 2009.
	pH	2004							H 7		M 2					M 6						L 6						
	ADEQ is currently establishing criteria to classify its lakes, which may result in changes in assessment status (M6). For efficiency, Both TMDLs will be developed at the same time (M6). Low dissolved oxygen, which may result in fish kills, would be detrimental to this important urban recreational area (H7). More investigation is needed to identify the sources of pollutants causing these water quality problems (L6).																											
French Gulch headwaters-Hassayampa River 10 miles AZ15070103-239	Copper	1994	H 1										M 3		M 5	M 6						L 6					High priority	TMDL study ongoing. Completion TMDL in 2004.
	Zinc	1994	H 1										M 3		M 5	M 6						L 6						
	Cadmium	2004											M 3		M 5	M 6					L 4		L 6				Medium priority	
	Although this reach is intermittent, the toxic nature of copper and zinc, along with the magnitude and duration of exceedances, pose a significant threat to wildlife which may drink pools remaining after monsoon rains or winter storms (H1): * Dissolved copper was measured as high as 1200 µg/L (almost 20 times the aquatic and wildlife standard), and exceeded the standards in 80 of 135 samples (60%); * Dissolved zinc was measured as high as 2260 µg/L (almost 8 times the aquatic and wildlife standard), and exceeded standards in 36 of 170 samples (20%). Although the cadmium can be a significant threat to aquatic and wildlife uses, the chronic standard was only exceeded on this intermittent reach in only 3 of 50 sampling events (L4). For efficiency, all three TMDLs will be developed at the same time and a scheduled for 2003-2004 (M6); however, the TMDL is expected to be very complex due to the nature of the pollutants (M5) and seasonal variation (M3). Intermittent stream flow and drought conditions will slow collection of adequate data to determine source loadings (L6).																											



Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE **					
Gila River Centennial Wash-Gillespie Dam 5 miles AZ15070101-008	Boron	1992							H 7				M 3		M 5							L 6					Medium priority	Initiate monitoring and investigation in 2006. Initiate TMDL in 2007. Complete TMDL in 2008.				
	Selenium	2004				H 4 *			H 7				M 3		M 5							L 6					High priority					
	The federally protected Yuma clapper rail and Southwest willow flycatcher have been found in this surface water and could be negatively impacted by elevated selenium (H4). Elevated selenium and boron may be associated with the extensive agriculture in the area; however, TMDL may be complex due to large number of potential sources and potential seasonal influences (M3, M5, L6). Boron concentrations found may impact downstream agricultural uses (H7) but present a low ecological and human health risk (L5). Coordinate TMDL investigations with boron and selenium investigation downstream, from Coyote Wash to Fortune Wash (M6).																															
<b>A. Gila River</b> 1. Salt River - Agua Fria River AZ15070101-015 2. Agua Fria River - Waterman Wash AZ15070101-014 3. Waterman Wash - Hassayampa River AZ15070101-010 4. Hassayampa River - Centennial Wash AZ15070101-009 5. Centennial Wash - Gillespie Dam AZ15070101-008 6. Gillespie Dam - Rainbow Wash AZ15070101-007 7. Rainbow Wash - Sand Tank AZ15070101-005 8. Sand Tank - Painted Rocks Reservoir <b>B. Painted Rocks Reservoir</b> AZ15070101-1020A <b>C. Painted Rocks Borrow Pit Lake</b> - See Colorado-Lower Gila Watershed) <b>D. Salt River</b> 23 <sup>rd</sup> Ave WWTP - Gila River AZ15060106B-001D <b>E. Hassayampa River</b> Buckeye Canal - Gila River AZ15070103-001B Total 99 miles and 100 acres	DDT metabolites, toxaphene, chlordane in fish tissue	1988 (EPA 2002)	H 1			H 4 *									M 5									L 6				High priority	Initiate monitoring and investigations in 2008. Initiate TMDLs in 2009. Complete TMDLs in 2010.			
	These pesticides still present a high risk to aquatic life and species that prey on them (H1). The federally protected Yuma clapper rail and Southwest willow flycatchers sighted in this area could be negatively impacted by the pesticides (H4). This will be a very complex TMDL due to the size of the drainage and potential sources (M5). The TMDL will require significant monitoring resources to determine the sources of this historic pesticide (L6).																															
Mineral Creek Devils Canyon-Gila River 10 miles AZ15050100-012B	Copper	1992	H 1										M 3	M 4	M 5												L 4				Low priority	Initiate monitoring and investigations in 2006. Initiate TMDLs in 2008. Complete TMDLs in 2009.  (Surface water to be in compliance with copper standards by April 2004 according to the signed consent decree.)
	Selenium	2004				H 4									M 5							L 4				L 6				High priority		

Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE **	
			The federally protected Southwest willow flycatcher found in this area could be negatively impacted by selenium. (H4). The copper poses some risk to public health and wildlife due to its toxicity (H1); however, based on a consent decree actions have been taken and have been generally successful at mitigating the copper contamination (M4)(L3). The mine monitors multiple sites on a monthly basis to evaluate the effectiveness of its actions. Further enforcement actions will be taken if compliance is not attained per consent decree by April 2004 (L3). Copper exceedances after treatment were related to storm flow (M3), and determining the source of copper during such storm flows may be complex due to historic mining and natural sources (M5). Intermittent stream flow and drought conditions have slowed collection of adequate data to determine source loadings (L6).																									
Queen Creek 1. headwaters-Superior Mine WWTP 9 miles AZ15050100-014A  2. Superior Mine WWTP - Potts Canyon AZ15050100-014B	Copper	2002 (reach A)												M 3		M 5						L 4		L 6			Medium priority	Initiate monitoring and investigation in 2004. Initiate TMDL in 2005. Complete TMDL in 2006.
		2004 (reach B)	A copper TMDL will be complex (M5) due to intermittent flows (L4), the nature of the pollutant (M5) and the probability that contamination is related to storm water runoff events (M3). More samples are needed to identify sources and evaluate the extent of contamination (L6). Although copper is toxic to aquatic life and wildlife, the copper listings are based on only two exceedances in nine samples and exceedances are just above standards; therefore, copper <u>not</u> a high risk to aquatic life and wildlife.																									
Turkey Creek unnamed tributary at 34 19°28'112 21°28" - Poland Creek 30 miles AZ15070102-036	Cadmium	1992	H 1			H 4		H 6					M 3	M 4	M 5	M 6						L 6				High priority	TMDL study ongoing. Anticipate completing TMDLs in 2004.	
	Copper	1992	H 1			H 4		H 6					M 3	M 4	M 5	M 6						L 6						
	Lead	2004				H 4		H 6					M 3	M 4	M 5	M 6				L 4		L 6						
	Zinc	1992	H 1			H 4		H 6					M 3	M 4	M 5	M 6						L 6						
			Cadmium, copper, and zinc pose a significant threat to wildlife due to the toxic nature of these pollutants, and the magnitude and frequency of exceedances as follows (H1): * Dissolved cadmium was measured as high as 931 µg/L (8 times the standard), and exceeded standards in 2 of 5 samples (40%); * Dissolved copper was measured as high as 13,600 µg/L (200 times the standard) and exceeded standards in 3 of 5 samples (60%); * Dissolved zinc was measured as high as 158,000 µg/L (more than 400 times the standard) and exceeded standards in 3 out of 5 samples. Although chronic lead can be a significant threat to aquatic and wildlife, the chronic standard was only exceeded in 2 of 7 samples and at relatively low concentrations on this intermittent reach (L4). The federally protected Gila topminnow occurs in this reach and could be negatively impacted by elevated metals in the water (H4). The Forest Service is supporting the development of this TMDL and is developing plans to remediate mine waste piles along this reach (H6, M4). The TMDL investigation is on ADEQ's 2003-2004 work plan (M6) but is complex due to the nature of metals and the length of the listed stream segment (21 miles). Metal contamination may be localized, exceedances are storm dependent. (M3, M5). Intermittent stream flow and drought conditions have slowed collection of adequate data to determine source loadings (L6).																									
Salt Watershed																												
Canyon Lake 450 acres AZL15060106A-0250	Low dissolved oxygen	2004							H 7				M 3			M 6							L 6			Medium priority	Initiate monitoring and investigation in 2007. Initiate TMDL in 2008. Complete TMDL in 2009.	
			This lake is an important recreational area (H7). Low dissolved oxygen may be related to seasonal activities (M3). More data are needed to identify sources (L6). ADEQ is currently establishing criteria to classify its lakes, which may result in changes in assessment status (M6).																									



Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE **
Christopher Creek headwaters-Tonto Creek 8 miles AZ15060105-353	Escherichia coli	2004	H 1						H 7				M 3			M 6						L 6				High priority	Ongoing TMDL investigation. TMDL to be completed in 2004.
			Exceedances of the Escherichia coli standard indicate a risk to public health (H1). Portions of this stream receive extensive recreational use (H7). Exceedances appear to be seasonal (M3), but more data are needed to identify sources (L6). TMDL is being completed in conjunction with Tonto Creek TMDLs (M6).																								
Crescent Lake 157 acres AZL15060101-0420	pH	2002							H 7		M 1					M 6						L 6				Medium priority	Initiate monitoring and investigation in 2007. Initiate TMDL in 2008. Complete TMDL in 2009.
			ADEQ is currently establishing criteria to classify its lakes, which may result in changes in assessment status (M6). This lake is an important fishing area and high pH levels may be associated with fish kills (last reported fish kill was in 1998) (H7). More monitoring data are needed to identify pollutants causing the high pH and sources of the pollutants (L6).																								
Pinto Creek Ripper Spring - Roosevelt Lake 18 miles AZ15060103-018C	Copper	2004				H 4		H 6								M 6						L 6				High priority	Phase II copper TMDL monitoring initiated in 2000 (on upstream reach). Initiate TMDL in 2004. Complete TMDL in 2005.
	Selenium	2004				H 4		H 6														L 6				High priority	
	The federally protected Colorado pikeminnow and bald eagles both occur in this area and could be negatively impacted due to elevated copper or selenium (H4). There is wide public support for development of TMDLs in Pinto Creek (H6). A Phase II copper TMDL conducted in the segment above this reach will be expanded to include this reach of Pinto Creek (M6). More data are needed to identify copper sources in this lower reach (L6).																										
Salt River Stewart Mountain Dam - Verde River 10 miles AZ15060106A-003	Low dissolved oxygen	2004							H 7				M 3									L 6				Medium priority	Initiate monitoring and investigation in 2007. Initiate TMDL in 2008. Complete TMDL in 2009.
	Copper	2004							H 7													L 6				Medium priority	
	Although exceedances of the chronic copper standard can be a significant threat to aquatic and wildlife, chronic standards were only exceeded in 3 of 81 sampling events. Low dissolved oxygen may be seasonal (M3).This section of the Salt River is an important recreational area (H7). More data are needed to identify potential sources of the copper and low dissolved oxygen (L6). The federally protected Yuma clapper rail and bald eagle should not be negatively impacted by the low dissolved oxygen or elevated copper.																										

Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE **	
San Pedro-Willcox Playa-Rio Yaqui Watershed																												
Mule Gulch (3 reaches)  1. headwaters - above Lavendar Pit 4 miles AZ15080301-090A  2. above Lavender Pit - Bisbee WWTP 1 miles AZ15080301-090B  3. Bisbee WWTP - Highway 80 bridge 4 miles AZ15080301-090C	Copper (090A, 090B, + 090C)	1990	H 1										M 3		M 5	M 6						L 6		L 8		Medium priority	Ongoing TMDL investigation and monitoring. Site-specific standard development to be completed in 2004. Complete TMDL in 2005.	
	Cadmium (090C)	2004	H 1										M 3		M 5	M 6						L 6		L 8				
	pH (090B +090C)	1990	H 1								M 1		M 3		M 5	M 6						L 6		L 8				
	Zinc (090C)	1990	H 1										M 3		M 5	M 6						L 6		L 8				
	TMDLs are underway to address loadings on all three segments of Mule Gulch and tributaries contributing significant loading. These TMDLs are complex due to wastewater discharges and natural background levels of copper (M3, M5) and data for source loading is difficult to collect due to slope, intermittent and ephemeral flows, and lack of rain (L6, L8). Currently ADEQ is developing site specific standards that account for loadings from naturally occurring conditions (M6, L8). The TMDL is classified as a medium priority due to the time required for development of these standards. The mining operation in the affected segments is implementing and continuing to develop additional Best Management Practices to address contamination issues. Copper, zinc, and low pH present a significant threat to wildlife and human health (H1) due to the toxic nature of these pollutants and the magnitude and frequency of the exceedances: * Dissolved copper was as high as 12,000 µg/L (185 times the aquatic and wildlife standard) and exceeded standards in 20 of 36 samples (55%) in Mule Gulch; * Dissolved zinc was as high as 3760 µg/L (10 times the aquatic and wildlife standard) and exceeded standards in 14 of 36 samples (39%) in Mule Gulch; * This area is a documented corridor for Mexican migrant traffic. Migrants crossing Arizona's desert may drink from reaches of Mule Gulch with flow. Consumption of this water would be hazardous due to the high metal content. Note: drought has slowed sampling and the development of these TMDLs. (L6)																											
San Pedro River Mexico border - Charleston 28 miles AZ15050202-008	Copper	2004														M 6						L 6	L 7			Medium priority	Initiate monitoring and investigation in 2005. Initiate TMDL in 2006. Complete TMDL in 2007.	
			For efficiency, copper TMDL will be coordinated with the <i>Escherichia coli</i> TMDLs in the upper San Pedro River (M6). More data are needed to identify potential sources of the copper (L6). This TMDL may be more complex due to potential sources in Mexico and uncertainty of timely coordination with international entities (L7). The federally protected Southwest Willow flycatcher found in this area should <u>not</u> be negatively impacted by the elevated copper.																									
San Pedro River Babocomari Creek - Dragoon Wash 17 miles AZ15050202-003	<i>Escherichia coli</i>	2004	H 1										M 3		M 5	M 6						L 6	L 7			Medium priority	Initiate monitoring and investigation in 2005. Initiate TMDL in 2006. Complete TMDL in 2007.	
			Exceedances of the <i>Escherichia coli</i> standard may represent a significant public health concern if people are swimming or even wading in the water (H1). Exceedances may be related to wet weather events (M3). The drainage area is relatively large and includes an area of Mexico, so determining the source of contamination may be complex and will require substantial monitoring data to identify sources (M5, L6, L7). Monitoring and investigation for the two reaches of the San Pedro River listed due to <i>Escherichia coli</i> will be coordinated (M6).																									



Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE **	
San Pedro River Dragoon Wash-Tres Alamos 16 miles AZ15050202-002	Nitrate	1990												M 4	M 5					tol							Low priority	Ongoing Superfund Cleanup remediation activities and effectiveness monitoring in this area. Initiate monitoring for TMDL in 2010. Initiate TMDL in 2011. Complete TMDL in 2012.
			The ADEQ WQARF (Superfund) Program is working with this site. The facility has instituted several actions to bring the surface and ground water into compliance with its standards and is conducting monthly monitoring of several sites along the San Pedro River (L3, M4). Although surface water quality is improving, cleanup will take time as there is significant contamination of the ground water which is seeping into the San Pedro (M5).																									
San Pedro River Aravaipa Creek - Gila River 15 miles AZ15050203-001	Escherichia coli	2004	H 1										M 3		M 5	M 6						L 6	L 7				Medium priority	Initiate monitoring and investigation in 2005. Initiate TMDL in 2006. Complete TMDL in 2007.
	Selenium	2004				H 4									M 5	M 6						L 6	L 7	L 8			High priority	
			Exceedances of the Escherichia coli standard may represent a significant public health concern if people are swimming or even wading in the water (H1). The federally protected bald eagle and the Southwest willow flycatcher found in this area may be negatively impacted by the elevated selenium (H4). E. coli exceedances may be related to wet weather events (M3). Prior monitoring and investigations should help support TMDL development; however, the drainage area is relatively large and includes an area of Mexico, so determining the source of contamination may be complex and will require substantial monitoring data to identify sources and natural background contributions (M5, L6, L7, L8). Monitoring and investigation for the two reaches of the San Pedro River listed due to Escherichia coli will be coordinated (M6).																									
Santa Cruz-Rio Magdalena-Rio Sonoyta Watershed																												
Lakeside Lake 15 acres AZ15050302-0760	Low dissolved oxygen	2004		H 2					H 7				M 3			M 6											High priority	Ongoing monitoring and investigation. TMDL will be completed in 2004.
	Ammonia	2004		H 2					H 7				M 3			M 6											High priority	
			An AZPDES permit revision is pending for a discharge to this lake (H2, M6). Low dissolved oxygen and elevated ammonia are related to historic fish kills at this lake, and the lake is an important urban recreational area (H7). Low dissolved oxygen and elevated ammonia may be related to seasonal activities (M3). Reclaimed water and storm water inputs make this TMDL complex (M5).																									
Nogales & East Nogales Wash Mexico border-Portrero Wash 6 miles AZ15050301-011	Ammonia	2004												M 4		M 6							L 7				Medium priority	Ongoing quarterly monitoring.  Necessity of TMDL will be based on outcome of current international discussions regarding upgrade of treatment facility.
	Chlorine	1996												M 4		M 6							L 7				Medium priority	
	Copper	2004													M 4		M 6							L 7			Medium priority	
	Escherichia coli	1998	H 1												M 4		M 6								L 7			
Exceedances of the Escherichia coli standard may represent a significant public health concern if people are swimming or even wading in the water (H1). Although ammonia, fecal coliform, chlorine are a significant threat to human health and wildlife (H1), actions to correct the situation are dependent on ongoing international negotiations between the U.S. government, Arizona, Mexico, the cities of Nogales, AZ and Nogales, Sonora, and the Mexican state of Sonora (L7, M4). Wastewater infrastructure in Mexico is badly deteriorated and must be replaced. Chlorine is sometimes added directly to the stream on the U.S. side of the border due to raw sewage overflows from Mexico. The source loadings are known and the technical means to correct the problem have been determined (M4). For efficiency, all four TMDLs will be developed at the same time (M6) if needed after facility upgrades.																												

Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE **	
Santa Cruz River Mexico border-Nogales WWTP 17 miles AZ15050301-010	Escherichia coli	2002	H 1					H 6														L 6	L 7			High priority	Stream has been dry due to drought in 2002-2003. TMDL monitoring will be initiated when flow resumes.  Hope to initiate TMDL monitoring by 2006. Initiate TMDL by 2007. Complete TMDL by 2008.  (Note: Long-term fixed station monitoring site at the border.)	
Exceedances of the <i>Escherichia coli</i> standard may represent a significant public health concern if people are swimming or even wading in the water (H1). This area is a corridor for Mexican migrants who may consume this water while crossing the desert, although the water is not protected for this use (H1). The Friends of the Santa Cruz River, a volunteer monitoring group, is interested in maintaining high quality water in the Santa Cruz River (H6). Completing this TMDL may be complex due to probable sources in Mexico (L7), and intermittent stream flow and drought conditions will slow collection of adequate data to determine source loadings (L6).																												
Sonoita Creek 750 feet below WWTP - Santa Cruz River 14 miles AZ15050301-013C	Zinc	2004				H 4																L 6				High priority	Initiate monitoring and investigation 2006. Initiate TMDL in 2007. Complete TMDL in 2008.	
The federally protected Gila topminnow occurs in this reach and could be negatively impacted by dissolved zinc (H4). Zinc exceedances just above standards; therefore, they do not represent a significant ecological health concern. Source of zinc is unknown (L6); however, a wastewater treatment plant is directly upstream from the monitoring site. Discharge monitoring reports from this treatment plant will be reviewed, and if needed, water quality improvements will be pursued through enforcement actions.																												
Upper Gila Watershed																												
Cave Creek headwaters - South Fork of Cave Creek 8 miles AZ15040006-852A	Selenium	2004			H 3																	L 6		L 8		High priority	Initiate monitoring in 2005. Initiate TMDL in 2006. Complete TMDL in 2007.	
This stream is classified as a Unique Water (H6). Further monitoring is needed to determine selenium source loading and contribution from natural sources (L6, L8).																												
Gila River Skully Creek - San Francisco River 15 miles AZ15040002-001	Selenium	2004													M 5							L 6				Medium priority	Initiate monitoring and investigation in 2007. Initiate TMDL in 2008. Complete TMDL in 2009.	
Monitoring and investigation is needed to determine potential sources of selenium (L6). Selenium may be contributed by sources in New Mexico, adding to the complexity of the TMDL (M5). Federally protected spinedace and loach minnow that occur in this area should <u>not</u> be negatively impacted by the elevated selenium.																												
Gila River Bonita Creek-Yuma Wash 6 miles AZ15040005-022	Escherichia coli	2004	H 1											M 3		M 5	M 6						L 6			Medium priority	Initiate monitoring and investigation in 2006. Initiate TMDL in 2007. Complete TMDL in 2008.	
Exceedances of the <i>Escherichia coli</i> standard may represent a significant public health concern if people are swimming or even wading in the water (H1). Exceedances may be related to wet weather events (M3). The drainage area is nearly 8,000 square miles, so determining the source of contamination may be complex and will require substantial monitoring data to identify sources (M5, L6). ADEQ will coordinate this investigation with the other <i>E. coli</i> TMDL downstream (M6).																												
Verde Watershed																												
East Verde River Ellison Creek - American Gulch 20 miles AZ15060203-022B	Selenium	2004																				L 6		L 8		Low priority	Ongoing fixed station monitoring. Initiate monitoring and investigation in 2010. Initiate TMDL investigation in 2011. Complete TMDL in 2012.	
Further monitoring and investigation is needed to determine source loadings and contribution from natural sources (L6, L8). The federally protected Gila trout that occur in this area should <u>not</u> be negatively impacted by the slightly elevated selenium.																												
Verde River Bartlett Dam - Camp Creek 7 miles AZ15060203-004	Copper	2004				H 4			H 7													L 5	L 6			High priority	Initiate monitoring and investigation in 2007. Initiate TMDL in 2008. Complete TMDL in 2009.	
	Selenium	2004				H 4			H 7													L 5	L 6					



Surface Water Identification	Pollutant	Year First Listed	H 1 *	H 2	H 3	H 4 *	H 5	H 6	H 7	H 8	M 1	M 2	M 3	M 4	M 5	M 6	L 1 *	L 2 *	L 3 *	L 4	L 5	L 6	L 7 *	L 8	L 9	RANKING	TIME TABLE **
			The Federally protected razorback sucker and bald eagle occur in this area. The copper may negatively impact the razorback sucker and the selenium may negatively impact the bald eagle (H4). Although exceedances of the chronic copper and selenium standards can be a significant threat to aquatic life and wildlife, chronic standards were only exceeded in 4 of 80 copper sampling events and 4 of 23 selenium sampling events (L5). This section of the Salt River is an important recreational area (H7). More data are needed to identify potential sources of the copper and low dissolved oxygen (L6).																								
Whitehorse Lake 41 acres AZL15060202-1630	Low dissolved oxygen	2004						H 7								M 6						L 6				Medium priority	Monitoring and investigation initiated in 2001. Initiate TMDL in 2005. Complete TMDL in 2006.
			ADEQ is currently establishing criteria to classify its lakes which may result in changes in assessment status (M6). Classification is to be completed by 2004. Low dissolved oxygen may result in fish kills, and this lake is an important fishing area (H7). More investigation is needed to identify the sources of pollutants causing the low dissolved oxygen (L6).																								

X = Factor present. X = most significant factors. Note that factors that frequently out rank others are shown with an asterisk (\*).

\*\* Date shown is when action is to be initiated. Time table will be adjusted based on availability of flowing water, as Arizona is currently in a drought, and availability of resources to complete TMDLs.

#### High Priority Factors:

H1. Substantial threat to health and safety of humans, aquatic life, or wildlife based on:

- Number and type of designated uses impaired,
- Type and extent of risk from the impairment to human health or aquatic life,
- Pollutant causing the impairment, or
- Severity, magnitude, and duration the surface water quality standard was exceeded.

H2. A new or modified individual NPDES or AZPDES permit is sought for discharge to the impaired water.

H3. Surface water is listed as a Unique Water or is part of an area classified as a "wilderness area", "wild and scenic river" or other federal or state special protection of the water resource.

H4. Surface water contains a species listed as "threatened" or "endangered" under the federal Endangered Species Act and the presence of the pollutant in the surface water is likely to jeopardize the listed species.

H5. A delay in conducting the TMDL could jeopardize ADEQ's ability to gather sufficient credible data necessary to develop the TMDL.

H6. There is significant public interest and support for development of a TMDL.

H7. The surface water or segment has important recreational and economic significance to the public.

H8. The pollutant has been listed for eight years or more (starting with the 2002 listing).

#### Medium Priority Factors:

M1. The surface water fails to meet more than one designated use.

M2. The pollutant exceeds more than one surface water quality standard.

M3. The exceedance is correlated to seasonal conditions caused by natural events such as storms, weather patterns, or lake turnover.

M4. Actions in the watershed may result in the surface water attaining applicable water quality standards; however, load reductions may take longer than the next 303(d) listing cycle.

M5. The type of pollutant and other factors relating to the surface water or segment make the TMDL very complex.

M6. ADEQ's administrative needs, including TMDL schedule commitments with EPA, permitting needs, or basin priorities that require completion of the TMDL.

#### Low Priority Factors:

L1. ADEQ has formally submitted a proposal to delist the surface water or pollutant to EPA. If ADEQ makes the submission outside of listing process cycle, the change in priority ranking will not be effective until EPA approves the report.

L2. ADEQ has modified or formally proposed a modification to the applicable surface water quality standard or designated use which would result in the surface water no longer being impaired, but the modification has not yet been approved by EPA.

L3. The surface water is expected to attain surface water quality standards due to any of the following:

- Recently instituted treatment levels or best management practices in the drainage area,
- Discharges or activities related to the impairment have ceased, or
- Actions have been taken and the controls are in place or scheduled for implementation that are likely to bring the surface water back into compliance.

L4. The surface water is ephemeral or intermittent. ADEQ shall re-prioritize the surface water if the presence of the pollutant in the listed water poses a threat to the health and safety of humans, aquatic life, or wildlife using the water (H1) or the pollutant is contributing to the impairment of a downstream, perennial surface water.

L5. The pollutant poses a low ecological and human health risk.

L6. Insufficient data exist to determine the source of the pollutant load.

L7. The uncertainty of timely coordination with national and international entities concerning international waters makes TMDL development complex.

L8. Naturally occurring conditions are a major contributor to the impairment.

L9. No documentation or effective analytical tools exist to develop a TMDL for the surface water with reasonable accuracy.





*A large tailings pile, leftover from the now abandoned Golden Turkey Mine, lies along the stream bank of Turkey Creek. These tailings are considered to be major contributing sources of the cadmium, copper, lead, and zinc that impair this stream. TMDL investigations are ongoing on this reach of Turkey Creek, near Bumble Bee, Arizona.*



## VI. How Clean Is Surface Water in Arizona?

This chapter provides a statewide overview of the 2004 assessment. It is a summary of the individual surface water assessments provided in Chapter IV and V. These statistics are used by EPA in its published reports to Congress on the quality of water in the United States. The discussion and graphics in this section cannot be used to infer water quality in surface waters not assessed nor water on tribal lands in Arizona.

### Water Quality in Streams, Canals, and Washes

For this assessment, 3,450 miles of streams, canals, and washes were assessed. **Figure 27** below illustrates the overall stream assessments by category (note that Category 2, "attaining some uses" and Category 3, "inconclusive" from Chapter V have been combined as "inconclusive"). It should be noted that the number of streams assessed is a small percentage of the approximately 90,375 miles of streams in Arizona; however, it includes 77% of the state's perennial stream miles (2,721 of the estimated 3,530 perennial miles). The primary goal of ADEQ's Ambient Monitoring Program is to monitor and assess all of Arizona's

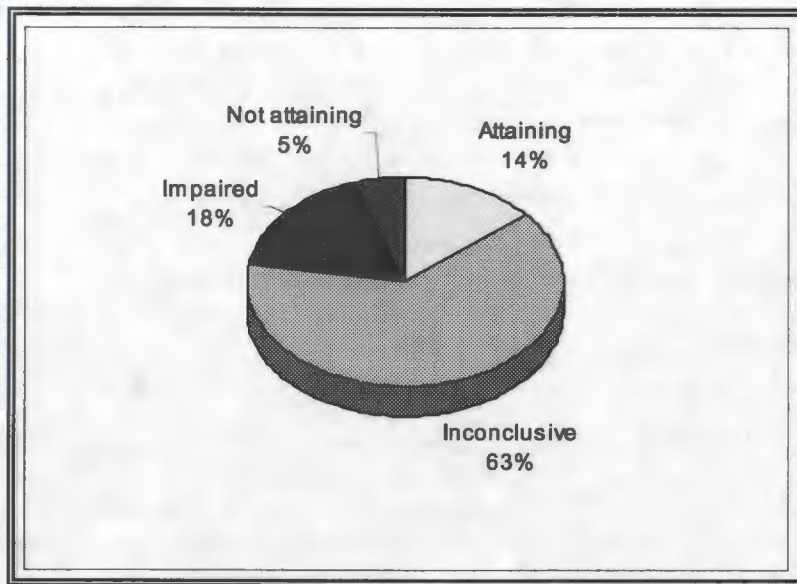


Figure 27. Overall use support assessments - streams

perennial stream miles and the majority of those with extended intermittent flow. Streams with ephemeral flow (flow only in direct response to precipitation) are a challenge to monitor and take much more time for a full assessment to be made.

As illustrated **Figure 28** below, relative use support is fairly consistent among all designated uses with the exception of Aquatic and Wildlife uses. For the fish consumption, body contact, domestic water source, and agricultural uses, approximately 40 - 60% are attaining the use, 40 - 60% are inconclusive and in need of further monitoring, and 5% or less are impaired or not attaining.

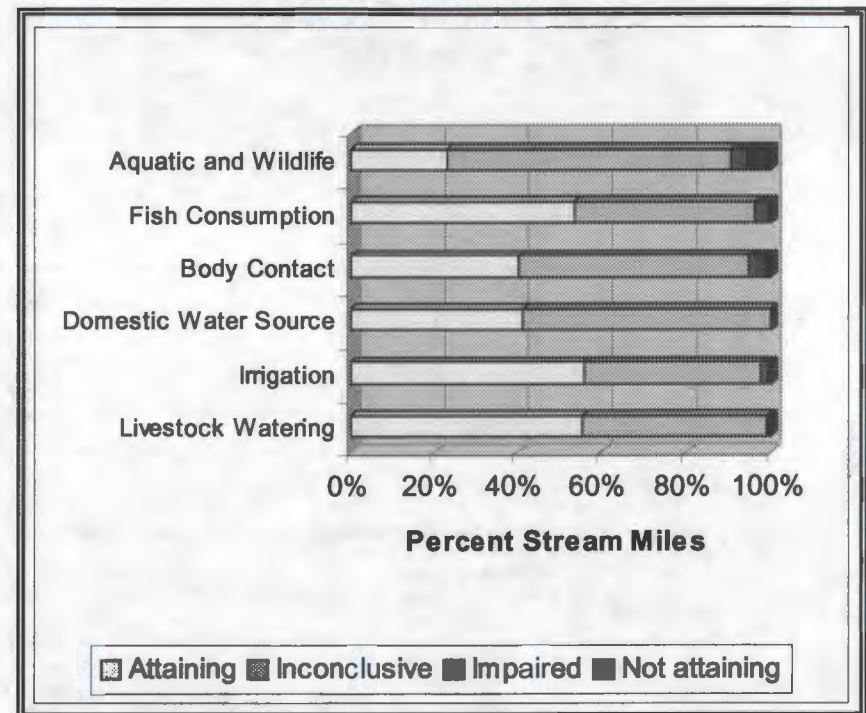


Figure 28. Support by designated use - streams

For the Aquatic and Wildlife designated uses, approximately 25% of the streams assessed are attaining, 60% inconclusive, and 15% impaired and not attaining. Overall, there are fewer streams attaining the use than in 2002. There are a couple of reasons for this change. This assessment was the first in which ADEQ applied chronic A&W standards using the Impaired Water Identification Rule. Chronic standards are much more stringent than the acute standards. Acute standards are set higher to address short-term exposure, while chronic standard are set lower to protect for long-term exposure.

Additionally, because chronic standards are so much lower, it was often the case that laboratory analyses did not produce detection limits low enough to assess chronic standards (detection limit was higher than the standard), resulting in an assessment of "inconclusive."

**Table 32. Use Support Summary – Streams Assessed in 2004**

Designated Uses	Attaining (miles)	Inconclusive (miles)	Impaired (miles)	Not Attaining (miles)	Total Assessed (miles)
<b>Overall Use Support</b>	<b>480.4</b>	<b>2,189</b>	<b>611</b>	<b>169.2</b>	<b>3,449.6</b>
<b>Aquatic and Wildlife</b>	715	2,076.54	125.6	167.7	3,084.84
<b>Fish Consumption</b>	1,668.8	1,340.64	98.9	12.1	3,120.44
<b>Body Contact</b>	1,366	1,845.34	125.6	42.2	3,379.14
<b>Domestic Water Source</b>	257.3	367.1	0	0	624.4
<b>Irrigation</b>	1,060.7	798.8	33.6	11	1,904.1
<b>Livestock Watering</b>	1,662.2	1,308.9	3	31.9	3,006



*This reach of the Agua Fria River, near Cordes Junction, Arizona, is attaining all of its designated uses.*



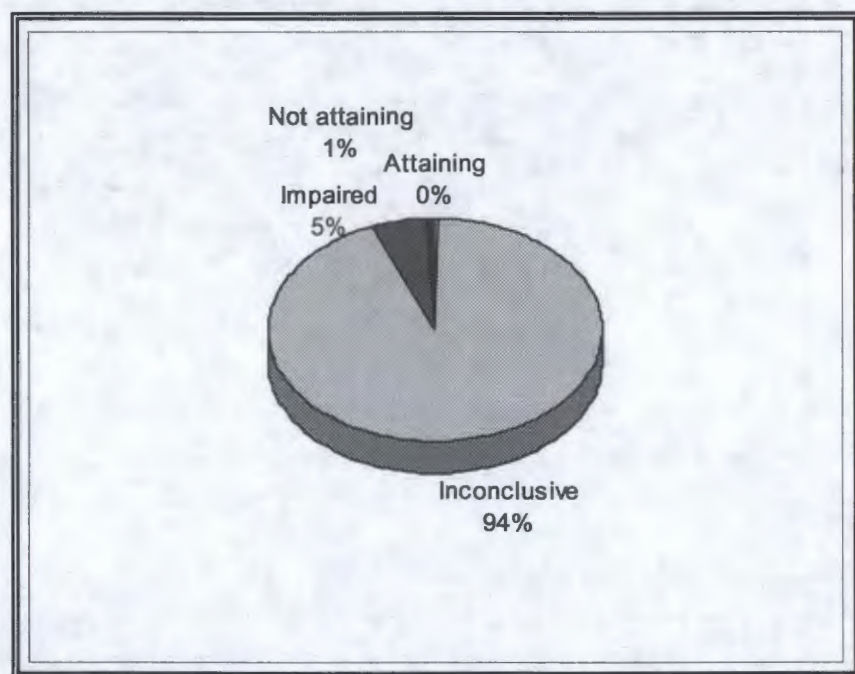
*An ADEQ staff member takes flow measurements on the Little Colorado River, near Springville, Arizona. This reach is not attaining its uses due to turbidity exceedances. A TMDL has already been completed.*



## Water Quality in Lakes and Reservoirs

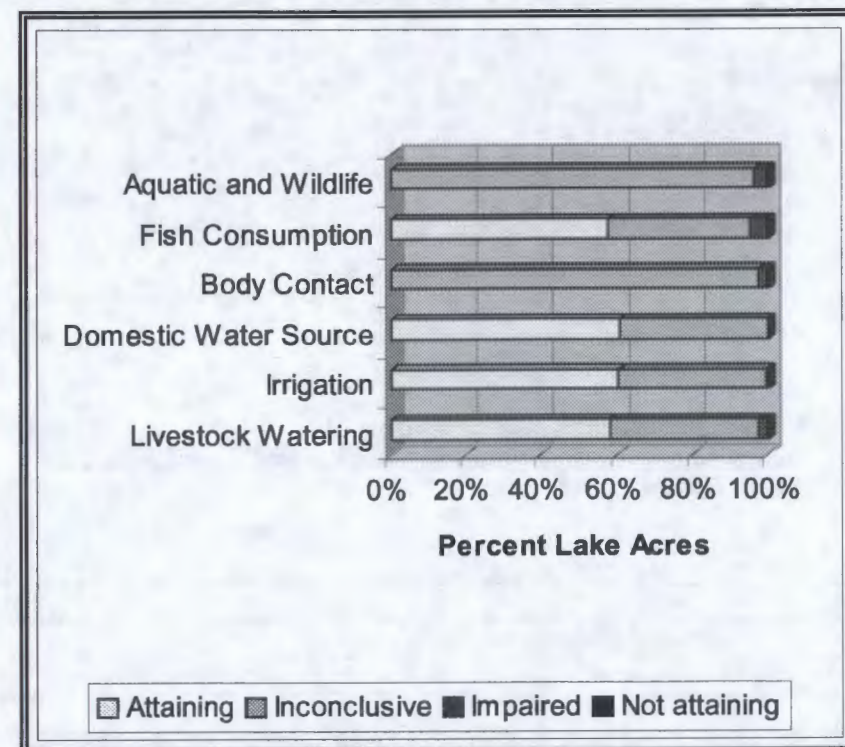
Of approximately 168,800 acres of perennial lakes or reservoirs in Arizona (not on Indian lands), 76,425 were assessed. The relative distribution of lake assessments by category is illustrated in **Figure 29** below. ADEQ's goal is to assess all perennial, publicly-owned lakes over the next two watershed cycles.

Of the lake acres assessed, approximately 94% were inconclusive and 6% impaired or not attaining. "Attaining" acres constitute only 220 (one lake) of the approximately 76,425 acres assessed, which is less than 1%. This percentage is rounded to "0%" in the graphic below. Many of the "inconclusive" lakes were simply lacking sufficient data to make a full assessment.



**Figure 29. Overall use support assessment – lakes**

As illustrated in **Figure 30** below, the relative use support in lakes is consistent among Fish Consumption, Domestic Water Source, Irrigation, and Livestock Watering, with about 60% attaining, 30-40% inconclusive, and less than 5% impaired or not attaining. A larger percentage of lakes acres are inconclusive for the Aquatic and Wildlife use, mostly due to application of chronic standards, and a lot more "not attaining," due to a number of nutrient TMDLs completed that addressed the A&W use. The large percentage of inconclusive lake acres for the Body Contact uses (Full and Partial) is mostly due to a lack of *Escherichia coli* data needed to make an assessment.



**Figure 30. Support by designated use – lakes**

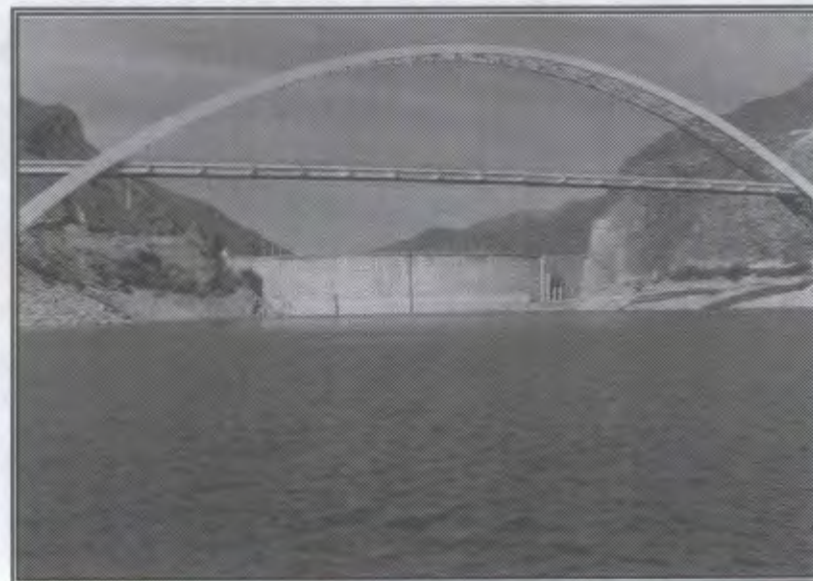


**Table 33. Use Support Summary – Lakes Assessed in 2004**

Designated Uses	Attaining (acres)	Inconclusive (acres)	Impaired (acres)	Not Attaining (acres)	Total Assessed (acres)
<b>Overall Use Support</b>	<b>220</b>	<b>71,569.5</b>	<b>4,021</b>	<b>615</b>	<b>76,425.5</b>
<b>Aquatic and Wildlife</b>	245	73,434.5	2,296	450	76,425.5
<b>Fish Consumption</b>	44,331	28,605.5	3,324	165	76,425.5
<b>Body Contact</b>	220	74,271.5	1,579	355	76,425.5
<b>Domestic Water Source</b>	40,692	26,319	0	0	67,011
<b>Irrigation</b>	43,725	28,027.5	152	235	72,139.5
<b>Livestock Watering</b>	43,869	29,747.5	1,564	355	75,535.5



*Peña Blanca Lake in southern Arizona is not attaining its uses. A TMDL for mercury in fish tissue was completed in 1999, and a fish consumption advisory is still in effect.*



*Roosevelt Lake, northeast of Phoenix, was impacted by the Rodeo-Chediski fire of 2002. Numerous violations of water quality standards occurred immediately following the fire. The status of this lake is inconclusive until more data are gathered to determine whether residual effects from the fire still remain.*

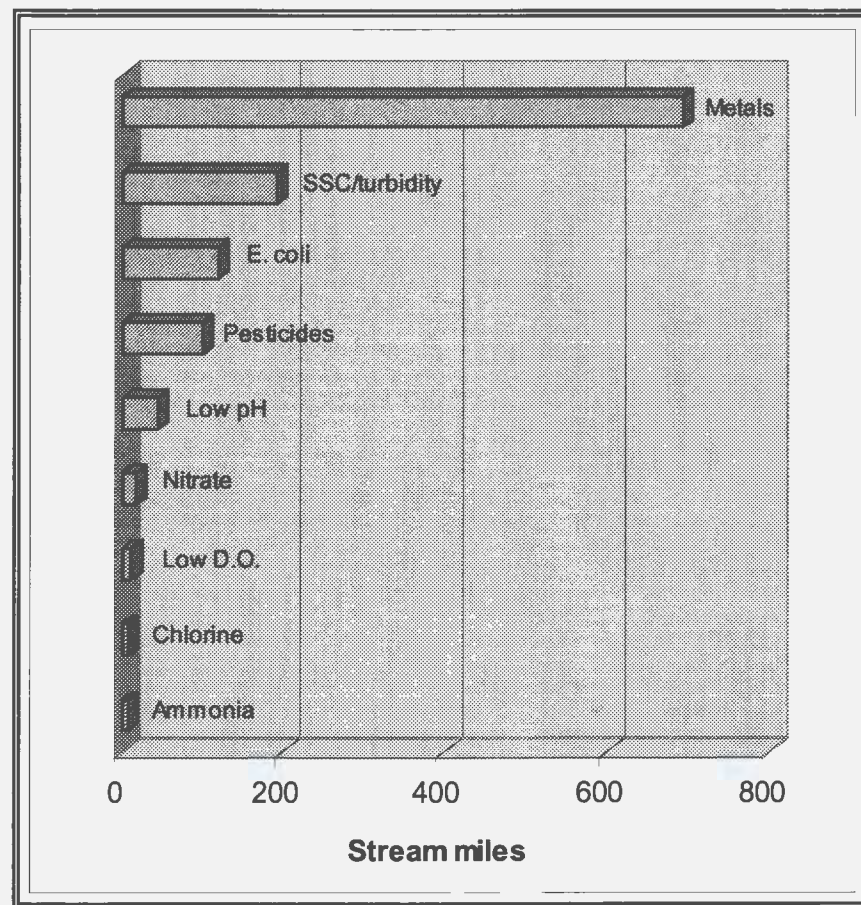


## What pollutants impair lakes and streams?

Pollutants identified in this assessment are summarized in **Tables 34 and 35** and compared in **Figures 31 and 32** below. Information about pollutants impairing a specific lake or stream is provided in Chapter IV. General information about these pollutants and their sources follows below.

**Table 34. Pollutants Impairing Arizona's Streams – 2004**

	Impaired or Not Attaining (miles)
<b>Metals/Metalloids</b>	
Arsenic	3
Boron	33.6
Cadmium	56
Copper	213.7
Lead	50.4
Mercury	37.4
Selenium	203.9
Silver	17.4
Zinc	78.9
<b>any metal</b>	<b>465.6</b>
<b>Suspended Sediment Concentration/Turbidity</b>	<b>191</b>
<b>Pathogens</b>	
<i>Escherichia coli</i>	119.5
<b>Pesticides</b>	
Chlordane	98.9
DDT	98.9
Toxaphene	98.9
<b>Low pH</b>	<b>44</b>
<b>Nutrients</b>	
Nitrate	15.5
Ammonia	6.2
<b>Low Dissolved Oxygen</b>	<b>10.1</b>
<b>Chlorine</b>	<b>6.2</b>

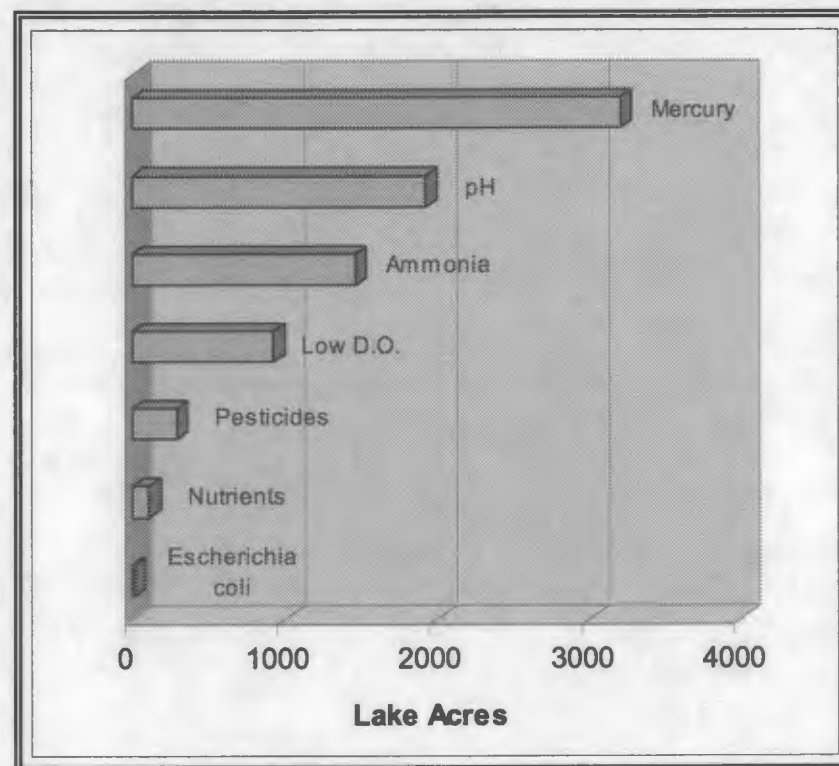


**Figure 31. Pollutants impairing streams**

**Table 35. Pollutants Impairing Arizona's Lakes**

	Impaired or Not Attaining (acres)
<b>Metals</b>	
Mercury	3,204
<b>pH</b>	1,921
<b>Ammonia</b>	1,456
<b>Low Dissolved Oxygen</b>	920
<b>Pesticides</b>	
Chlordane	285
DDT	285
Toxaphene	285
<b>Nutrients</b>	110
<b>Pathogens</b>	
<i>Escherichia coli</i>	13

**Metals** – Metals can leach more readily from soil or mineralized rock that has been exposed by mining, road building or land development activities. Ore bodies can also naturally contribute metals to streams and ground water springs recharging streams. Arizona has extensive areas of mineralized rock, and therefore, a high potential for metals pollution. Generally, metals (e.g., beryllium, cadmium, copper, manganese, mercury, silver, and zinc) rapidly adhere to sediment, with the more toxic dissolved metals being present in surface water only for relatively short distances near mining sites or other potential sources. When metal-contaminated sediment is transported downstream to a lake, the water slows and the sediments drop to the bottom of the lake. Metals do not readily go back into a dissolved state in these relatively alkaline lakes, and the contamination is buried under layers of sedimentation. Therefore we do not often see metals pollution in lakes, with the exception of mercury.



**Figure 32. Pollutants impairing lakes**

Once elemental mercury is methylated by microbes in the bottom of the lake, methylmercury can then bioaccumulate in aquatic life. The concentration of mercury then biomagnifies (compounds) as contaminated tissue is consumed in the food chain. This also means that mercury can occur well below the detection limit in surface water samples and even in the sediment, while fish tissue can be contaminated through bioaccumulation to a level that is hazardous for human consumption or for wildlife that prey on these fish.





*ADEQ staff members practice "clean-sampling" techniques on Alamo Lake in the Bill Williams watershed. Clean sampling techniques should allow ADEQ to achieve lower laboratory detection limits for mercury. Alamo Lake is on the 2004 303(d) List due to mercury in fish tissue, ammonia and pH. A fish consumption advisory was issued in February 2004.*

**Low Dissolved Oxygen, High pH and High Nutrient Levels** – Varying combinations of these factors occur in many of Arizona's shallow, constructed lakes, and in streams as well, although less often. Low dissolved oxygen and high pH stress aquatic organisms and can contribute to fish kills. A high density of submerged and emergent aquatic vegetation can restrict recreational activities. In addition, algal blooms which can result from increased nutrients use a substantial amount of oxygen in the water at night when photosynthesis cannot take place.

**Pathogens** – ADEQ measures pathogen levels by testing for *Escherichia coli*. While some amount of pathogens occurs naturally in the environment, they can sometimes reach dangerously high levels and pose a threat to human health. Some swimming areas regularly close to the public when this happens.

**Pesticides** – Most of the pesticides found in Arizona's surface waters are now banned from use in the United States. However, these substances take a long time to degrade and are still a problem today. They often are present in bottom

sediment, where they can bioaccumulate up the food chain to fish and fish predators, including humans.

**Turbidity and Suspended Sediment Concentration (SSC)** – Arizona repealed its turbidity standard in 2002 and adopted a suspended sediment concentration standard to protect Aquatic and Wildlife designated uses. Turbidity is a qualitative measure of water clarity or opacity, while suspended sediment concentration is a quantitative measure of suspended solids. These two parameters represent two different ways to measure fine suspended particles such as clay, silt, organic and inorganic matter, plankton, and other microscopic organisms.

Arizona's turbidity standard was derived from criteria established in more humid states that do not share its unique arid conditions, relatively low plant coverage, and erodible soils. These factors make some degree of suspended solids a natural phenomenon in Arizona; however, there are numerous other human-induced causes that have raised suspended sediment loads to an unhealthy level in some of Arizona's lakes and streams. Excessive suspended solids may be associated with aquatic habitat degradation such as reduced light penetration, temperature changes, excessive bottom deposits, and algal blooms.

Arizona's new numeric suspended sediment concentration criterion is intended to protect fish in streams, with the exception of effluent-dominated streams. It is also not applicable to lakes. Arizona's SSC standard is set at 80 mg/L, expressed as the geometric mean of at least four samples. The new standard is only applicable to samples collected at or near base flow and does not apply to a surface water during or soon after a precipitation event.

Since the SSC standard was just recently adopted in 2002, a minimal amount of data were available for this assessment. Thus, ADEQ has continued to assess the turbidity standard repealed in 2002 in an effort to record potential suspended sediment problems. Additionally, these exceedances provide evidence of a potential narrative bottom deposits standard violation.

**Table 36** on the next page provides a checklist of those waters with significant turbidity and/or SSC exceedances. These lakes and streams will be prioritized for further suspended sediment and bottom deposit studies.



**Table 36. Surface waters with significant turbidity and/or SSC exceedances**

Parameter		Suspended Sediment Concentration		Turbidity		
Waterbody	Waterbody ID	Impaired due to SSC*	Inconclusive due to SSC	On the 2002 303(d) List for turbidity	Significant number of turbidity exceedances (would have been listed by ADEQ or EPA under repealed standard) **	Turbidity TMDL complete (not attaining)
<b>Bill Williams Watershed - (none)</b>						
<b>Colorado - Grand Canyon Watershed</b>						
Colorado River, Parashant Canyon - Diamond Creek	AZ15010002-003	X		X	X	
Dogtown Reservoir	AZL15010004-0480				X	
Paria River, Utah border - Colorado River	AZ14070007-123	X			X	
Virgin River, Beaver Dam Wash - Big Bend Wash	AZ15010010-003	X		X	X	
<b>Colorado - Lower Gila Watershed</b>						
Colorado River, Indian Wash - Imperial Dam	AZ15030104-001		X			
Colorado River, Main Canal - Mexico border	AZ15030107-001		X			
<b>Little Colorado Watershed</b>						
Ashurst Lake	AZL15020015-0090				X	
Billy Creek, headwaters - Show Low Creek	AZ15020005-019				X	
Chevelon Creek, Black Canyon - Little Colorado River	AZ15020010-001				X	
Kinnikinnick Lake	AZL15020015-0730				X	
Little Colorado River, West Fork - Water Canyon Creek	AZ15020001-011				X	X
Little Colorado River, Water Canyon Creek - Nutrioso Creek	AZ15020001-010				X	X
Little Colorado River, Nutrioso Creek - Camero Wash	AZ15020001-009				X	X
Little Colorado River, unnamed trib (15020001-021) - Lyman Lake	AZ15020001-005				X	X
Little Colorado River, Silver Creek - Carr Wash	AZ15020002-004				X	
Little Colorado River, Zion Reservoir - Concho Creek	AZ15020002-016		X			
Little Colorado River, Porter Tank - McDonalds Wash	AZ15020008-017	X				
Nutrioso Creek, headwaters - Picnic Creek	AZ15020001-017					X
Nutrioso Creek, Picnic Creek - Little Colorado River	AZ15020001-015					X
Show Low Creek, headwaters - Linden Wash	AZ15020005-012				X	



Parameter		Suspended Sediment Concentration		Turbidity		
Waterbody	Waterbody ID	Impaired due to SSC*	Inconclusive due to SSC	On the 2002 303(d) List for turbidity	Significant number of turbidity exceedances (would have been listed by ADEQ or EPA under repealed standard) **	Turbidity TMDL complete (not attaining)
<b>Middle Gila Watershed</b>						
Gila River, Centennial Wash - Gillespie Dam	AZ15070101-008			X	X	
<b>Salt River Watershed</b>						
Christopher Creek, headwaters - Tonto Creek	AZ15060105-353			X	X	
Roosevelt Lake	AZ15060103-1240				X	
Salt River, Pinal Creek - Roosevelt Lake	AZ15060103-004		X			
Tonto Creek, headwaters - unnamed trib at 34 18'10"/111 Q4'14"	AZ15060105-013A			X	X	
Tonto Creek, unnamed trib at 34 18'10"/111 Q4'14" - Haigler Creek	AZ15060105-013B			X	X	
<b>San Pedro Watershed - (none)</b>						
<b>Santa Cruz Watershed</b>						
Lakeside Lake	AZ15050302-0760				X	
Nogales and East Nogales Washes	AZ15050301-011			X	X	
Santa Cruz River, Josephine River - Tubac bridge	AZ15050301-008A			X	X	
<b>Upper Gila Watershed</b>						
Gila River, San Francisco River - Eagle Creek	AZ15040005-024				X	
Gila River, Eagle Creek - Bonita Creek	AZ15040005-023				X	
Gila River, Bonita Creek - Yuma Wash	AZ15040005-022		X	X	X	
San Francisco River, headwaters - New Mexico border	AZ15040004-023				X	
San Francisco River, Limestone Gulch - Gila River	AZ15040004-001			X	X	
<b>Verde Watershed</b>						
Beaver Creek, Dry Beaver Creek - Verde River	AZ15060202-002			X	X	
Verde River, Oak Creek - Beaver Creek	AZ15060202-015					X
Verde River, Beaver Creek - HUC boundary 15060203	AZ15060202-001					X
Verde River, West Clear Creek - Fossil Creek	AZ15060203-025				X	X
Verde River, Tangle Creek - Ister Flat	AZ15060203-018				X	



Parameter		Suspended Sediment Concentration		Turbidity		
Waterbody	Waterbody ID	Impaired due to SSC*	Inconclusive due to SSC	On the 2002 303(d) List for turbidity	Significant number of turbidity exceedances (would have been listed by ADEQ or EPA under repealed standard)**	Turbidity TMDL complete (not attaining)
Whitehorse Lake	AZL15060202-1630				X	

\* Note that SSC data were not available for most waters

\*\* EPA may choose to list these waters in 2004 based on evidence of a narrative bottom deposit standard violation



*The high suspended sediment levels are evident in the murky brown water of the Little Colorado River near Woodruff, Arizona. This reach of the Little Colorado, from Silver Creek to Carr Wash, is on the Planning List due to exceedances of the former turbidity standard.*



*An ADEQ staff member conducts sampling at a gage station specially constructed for a sediment study. The gage is located on the West Fork of the Black River in eastern Arizona. Data from this study were not yet available for this assessment.*

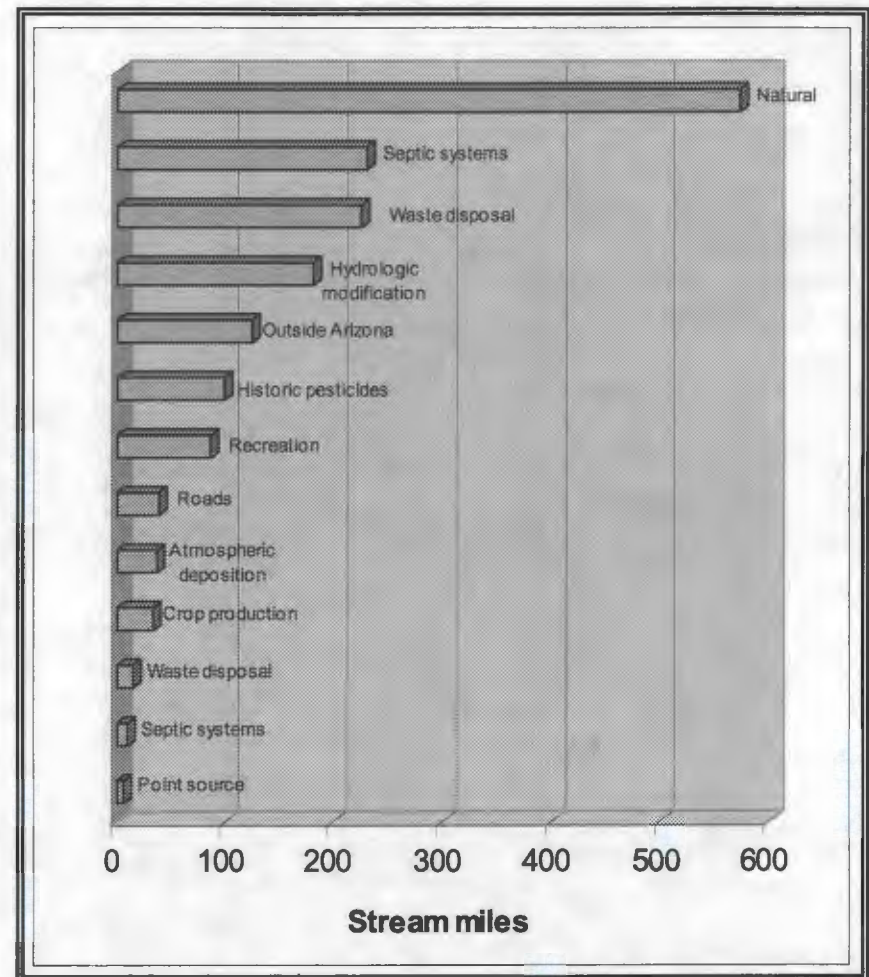


## What are the major sources of these pollutants?

The probable sources of pollutants impairing water quality in Arizona are reported in Tables 37 and 38 and compared in Figures 33 and 34 below. It is important to note that more than one source may be impacting a given stream reach or lake. Although the largest contributing source is natural, often this represents only a partial contribution of the pollutant. Also important to note is that for most streams and lakes, only a potential, unconfirmed source can be identified based on best available information, knowledge of land uses and activities, and geology of the watershed. Documented source identification is limited to locations where special investigations, such as a TMDL analysis, have been conducted.

**Table 37. Probable Sources of Stream Pollutants**

	Impaired or Not Attaining (miles)
<b>Natural Sources</b>	<b>572.7</b>
<b>Agriculture</b>	
Grazing	224.3
Historic pesticides	98.9
Crop production	33.6
<b>Mining</b>	<b>230</b>
<b>Hydrologic modification</b>	<b>181.6</b>
<b>Outside Arizona</b>	<b>124.1</b>
<b>Recreation</b>	<b>85.7</b>
<b>Roads</b>	<b>38.6</b>
<b>Waste disposal</b>	<b>15.5</b>
<b>Septic systems</b>	<b>9.5</b>
<b>Point source</b>	<b>6</b>



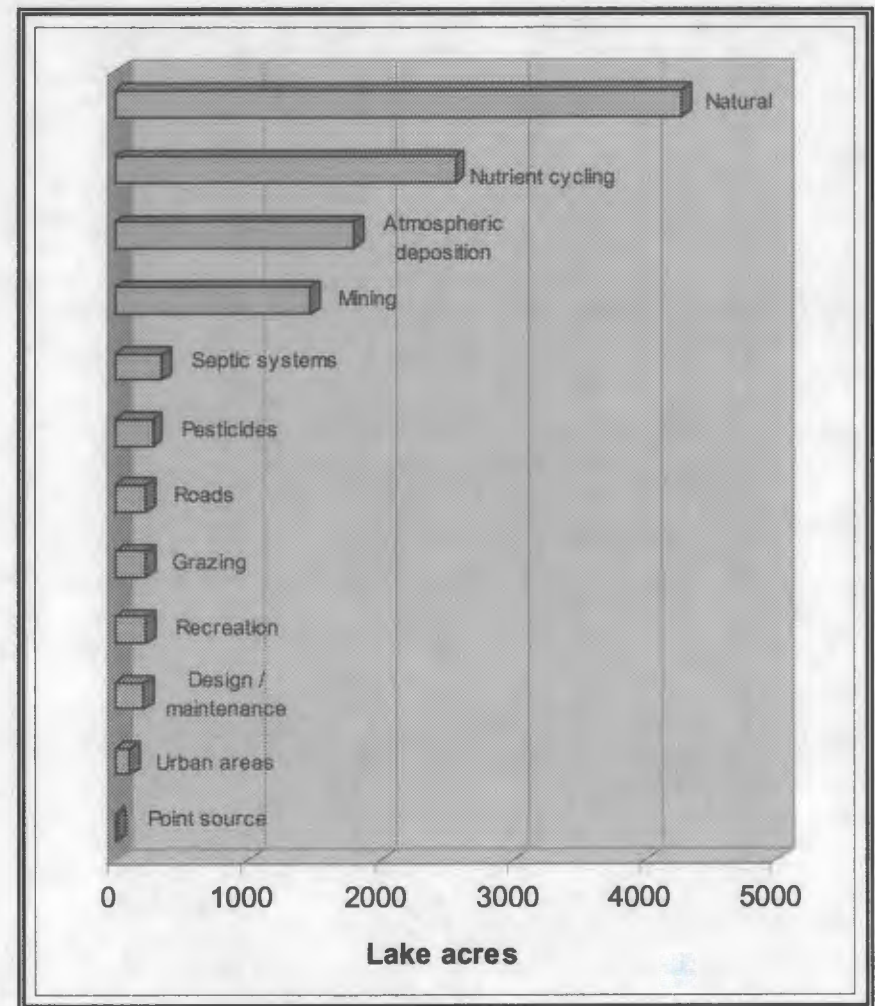
**Figure 33. Probable sources of pollutants in streams**

**Table 38. Probable Sources of Lake Pollutants**

	Impaired or Not Attaining (acres)
<b>Natural</b>	4,274
<b>Nutrient cycling</b>	2,561
<b>Atmospheric deposition</b>	1,790
<b>Mining</b>	1,464
<b>Septic systems</b>	355
<b>Agriculture</b>	
Historic pesticides	285
Grazing	230
<b>Recreation</b>	228
<b>Design/Maintenance</b>	215
<b>Urban Area</b>	112
<b>Point Source</b>	15

**Natural Contributions** -- Pollution is defined in the Clean Water Act, section 502 as a manmade or human-induced alteration of the chemical, physical, biological, and radiological integrity of water. Therefore, high levels of a pollutant which occur solely due to natural conditions are not a violation of Arizona's surface water quality standards because of a "natural background" exemption in the standards. However, natural sources do make some relative contribution to most impaired waters. For example, copper is a naturally occurring substance in Arizona, but mining can disturb the earth and release unnaturally high amounts of copper into streams. Arizona's soils are highly erodible and have the potential to contribute suspended sediment easily, but grazing can add even more sediment to a stream. In addition, sunny and arid conditions can lead to excessive algal productivity and eutrophic lake conditions such as low dissolved oxygen and high pH, but poor lake design or maintenance can do the same.

It is indeed clear from the graph on the previous page that natural sources make up a large portion of the pollutants impairing Arizona's streams and lakes. It is important to keep in mind, however, that this is a relative contribution which can be very small or very large. The graph should not be interpreted to mean that most of Arizona's impairments are natural. Determining the relative contribution of natural sources among other potential sources may require sophisticated analysis requiring large amounts of data. This level of detailed analysis is



**Figure 34. Probable sources of lake pollutants**



conducted for a TMDL, use attainability analysis, or to develop a site-specific standard.

**Mining** – Resource extraction activities and the natural occurrence of ores are frequently the source of metals and low pH in Arizona’s streams. Mining occurs in Arizona because metal ores are present.

**Nutrient Cycling** – Although normal for a lake system, nutrient cycling may cause nutrient over-enrichment and hypereutrophic conditions, which can in turn result in low dissolved oxygen levels and fish kills. Nutrient cycling can be exacerbated by excessive nutrient loading from sources such as agriculture or septic systems.

**Shallow Lake Design and Maintenance** – The construction and maintenance of a relatively shallow lake can result in negative impacts to the water chemistry or biological community. The physical characteristics of the lake (depth, volume, flushing rate) need to be in balance with natural rates of sediment transport and trophic conditions. When a lake or reservoir routinely exceeds narrative or numeric standards, redesigning the lake or changing maintenance procedures may be necessary to alleviate the water quality problems.

**Agriculture** – Agricultural sources can be broadly grouped into four areas of concern: crop production, grazing, concentrated animal feeding operations, and historic use of banned pesticides.

- Irrigated crop production is a probable source of pollutants such as turbidity, boron, selenium, nutrients, and pesticides. Crop production is concentrated around areas with adequate surface or ground water in Arizona, such as along the Colorado River, the Salt River, the Gila River, and the Verde River.
- Livestock and wildlife grazing are widely distributed throughout the state, occurring on lands owned or managed by federal agencies, Arizona State Land Department, privately owned lands and Indian reservations. Grazing activities may contribute pollutants such as bacteria, nutrients, and suspended sediments (measured as turbidity and SSC).
- Concentrated animal feeding operations (CAFOs) are scattered across the state. These livestock holding areas are a concern due to potential discharges of nutrients, bacteria, and suspended sediment to surface and ground waters.
- Historic use of banned pesticides still causes water quality problems today. Banned pesticides such as DDT take a long time to degrade and bioaccumulate in fish tissue, where they can be passed on to offspring and predators, including humans. It is also possible that these substances are still being used illegally.

**Recreation** – The high concentration of people in many of the state’s popular recreational areas can be a source of water quality impairment. Large numbers of motorized boats can spill a significant quantity of oil and gasoline into lakes. Off-road vehicles can erode sediment into streams. Human and pet waste not properly disposed of can contribute pathogens to the water. Even the feeding of wildlife, such as ducks on our urban lakes, can concentrate these animals in unnaturally high numbers around waterways. As a result, animal waste can reach very high levels in the water.

**Urban Runoff** – The hard surfaces that cover our state’s urban areas can contribute pollutants to Arizona’s waters. Roads, sidewalks, and parking lots are impervious surfaces where water cannot permeate the ground. Urban runoff is especially severe during storm events, which can quickly transport pollutants such as sediment from roads or fertilizer from yards into streams and lakes.

**Hydrologic Modification** – Stream channelization and dam construction are two examples of hydrologic modification in Arizona. These physical alterations can result in water quality problems such as increased sedimentation or excessive nutrient loading due to the removal of “buffer zones” around streams and lakes that would normally filter out pollutants.

## A few words about point and nonpoint sources

Water pollution is often discussed in terms of “point” and “nonpoint” sources. Thirty years ago, federal and state regulations primarily governed point source discharges through NPDES permit requirements. Point sources come from a discrete discharge point or discharge pipe (e.g., wastewater treatment plant discharge). However, water pollution also comes from more diffuse sources that are referred to as nonpoint sources, such as runoff from fields, urban areas, or mining operations.

As indicated in **Table 39**, most pollution in Arizona’s surface waters is contributed by nonpoint or diffuse sources of pollution. This may indicate the effectiveness of the state and federal regulatory programs working with point source discharges and that control of nonpoint source contributions largely remains non-regulatory, based on education and funding mitigation projects.

**Table 39. Point and Nonpoint Source Contribution to Impairment**

	Streams, canals, and washes (miles)	Lakes and reservoirs (acres)
Point Sources	6	15
Nonpoint Sources	735	23,115



For example, in addressing nonpoint source contributions to an impaired surface water, the TMDL Program works with all interested parties to identify implementation strategies to mitigate the problem. Then ADEQ's Nonpoint Source and Watershed Management Programs work with the local watershed work groups and federal agencies to identify funding sources to implement control strategies. Federal agencies, such as the Forest Service and Bureau of Land Management, address nonpoint source pollution in their management strategies by requiring the implementation of Best Management Practices.

## **Is the water safe to drink, swim in, and fish from?**

**Can We Drink the Water?** – The quality of water delivered by public water systems is strictly regulated and monitored to ensure that federal and state standards established to protect public health are met. Drinking water advisories are issued by the supplier when monitoring confirms that a drinking water standard has been exceeded. If water is supplied by a public water system, information about the quality can be obtained by contacting the supplier and requesting a consumer confidence report, or by contacting ADEQ's Drinking Water Program at 1-800-234-5677, Extension 771-4624.

When water is supplied by a private water system (i.e., a system serving less than 15 connections and 25 people), it is the user's responsibility to test and protect the quality of their drinking water. General water quality information and ways to protect drinking water sources can be obtained by contacting a county health department. Ground water quality information about wells monitored in an area can also be obtained from EPA's STORET database through the internet at: <http://www.epa.gov/STORET>

**Is It Safe to Swim in the Water?** – Frequently visited swimming areas are monitored for *Escherichia coli*, such as at Slide Rock State Park, Lake Havasu, Lake Powell, and the Salt River Recreation Area. Beaches have been closed when verification sampling results exceed water quality standards and remain closed until standards are met. ADEQ is unaware of routine monitoring at other swimming and water-skiing areas. Studies suggest that swimming should be avoided in storm water runoff and in stagnant water. Waters classified as "effluent dependent waters" and many urban lakes are also not designated for swimming or wading uses.

Mohave County monitors beaches regularly in Lake Havasu during the summer. Extensive studies and mitigation actions were conducted in Thompson Bay in the 1990's to correct historic pathogen problems.

The Bureau of Reclamation in cooperation with the National Park Service monitors beaches once a week during the summer in Lake Powell. Lake Powell

beach closures have occurred only in Utah.

The US Forest Service monitored the Salt River Recreation Area during the summers of 2002 and 2003 under ADEQ's Water Quality Improvement Grant Program. Monitoring data showed nominal bacterial levels, with no confirmed exceedance which would cause a swimming closure. ADEQ awarded a Water Quality Improvement Grant to improve sanitary conditions in this heavily used recreation area.

Of the monitored swimming areas, only Slide Rock State Park closed for swimming during the assessment period. A bacteria Total Maximum Daily Load (TMDL) analysis has been completed on Oak Creek at Slide Rock State Park, which estimated contributing loads from sources within this sub-watershed and developed alternatives to mitigate impacts to water quality. The following Slide Rock swimming closures occurred during the assessment period:

1998 - 7 closures, occurring June through September

1999 - 10 closures, occurring July through September

2000 - 20 closures, occurring May through September

2001 - 16 closures, occurring June through September

2002 - 3 closures, occurring July through August

**Should We Eat the Fish?** – Some chemical pollutants concentrate in fish and shellfish by accumulating in fatty tissues or selectively binding to muscle tissue. Some of these pollutants cannot be detected in the water column nor in bottom sediments, but bioaccumulate in aquatic life. This bioaccumulation may pose a threat to human health if these organisms are eaten on a regular basis in excess of federal fish consumption advisory guidelines.

Fish consumption advisories are issued to inform the public about possible adverse health effects and contain recommendations for how many fish meals can safely be consumed. Advisories may be directed at a particular subset of the population because some people are at greater risk (e.g., sport or subsistence fishers, pregnant women and children).

In Arizona, fish consumption advisories are currently in effect in 12 areas (**Table 40 on the next page**). Additional information about fish tissue screening and fish advisories can be obtained by contacting ADEQ at (602) 771-4536 or Arizona Game and Fish Department at (602) 789-3260.



**Table 40. Fish Consumption Advisories – 1998-present**

Waterbody Name Size	Pollutant and Sources	Advisory and Date
Painted Rocks Reservoir, Painted Rock Borrow Pit Lake, and portions of the Gila, Salt, and Hassayampa rivers – 380 acres and 140 miles	DDT metabolites, toxaphene, dieldrin, and chlordane pesticide pollutants due to historic use of these banned pesticides.	Since 1991 – Do not consume fish and other aquatic organisms.
Dysart Drain (canal drains to Agua Fria River in the Phoenix metro area) – 3 miles	DDT metabolites contamination caused by historic use of this pesticide.	Since 1995 – Do not consume fish and other aquatic organisms.
Arivaca Lake – 120 acres	Mercury contamination. Potential sources include mine tailings, atmospheric deposition, and naturally mineralized soils.*	Since 1996 – Do not consume fish and other aquatic organisms.
Pena Blanca Lake – 50 acres	Mercury contamination caused by historic mining and natural conditions at the lake.*	Since 1995 – Do not consume fish and other aquatic organisms.
Upper and Lower Lake Mary – 1625 acres combined	Mercury contamination. Sources to be investigated.	Since May 2002 – Do not consume walleye fish and limit consumption of other fish to one 8-ounce fillet per month.
Parker Canyon Lake – 129 acres	Mercury contamination. Sources to be investigated.	Since October 2002 –  Women of childbearing age and children under age of 16: No consumption  Women not in above categories: Consult health care provider  Adult men (16 yrs. or older): Three 8 ounce (uncooked weight) fish meals per month
Lyman Lake – 1500 acres	Mercury contamination. Sources to be investigated	Since October 2002 –  Children under the age of 6: No consumption  Women of childbearing age and children under the age of 16: One 8 ounce (uncooked weight) fish meal per month  Women not in above categories: Consult health care provider  Adult men (16 yrs. or older): Five 8 ounce (uncooked weight) fish meals per month

Soldier Lake – 28 acres	Mercury contamination. Sources to be investigated.	Since July 2003 – Do not consume fish.
Soldier Annex Lake – 122 acres	Mercury contamination. Sources to be investigated.	Since July 2003 – Do not consume fish.
Long Lake – 594 acres	Mercury contamination. Sources to be investigated.	Since July 2003 – Do not consume fish.
Alamo Lake - 1,414 acres           (continued on next page)	Mercury contamination. Sources to be investigated.	<p>Since February 2004 -</p> <p>Children under the age of 6: No consumption of largemouth bass or black crappie</p> <p>Women of childbearing age: One 8 ounce (uncooked weight) fish meal per month of largemouth bass or black crappie</p> <p>Women not of childbearing age: Five 8 ounce (uncooked weight) fish meals per month of largemouth bass or black crappie</p> <p>Adult men (16 yrs. or older): Six 8 ounce (uncooked weight) fish meals per month of largemouth bass or black crappie</p>
Coots Lake - 229 acres	Mercury contamination. Sources to be investigated.	<p>Since February 2004 --</p> <p>Children under the age of 6: No consumption of largemouth bass</p> <p>Women of childbearing age: One 8 ounce (uncooked weight) fish meal per month of largemouth bass</p> <p>Women not of childbearing age: Five 8 ounce (uncooked weight) fish meals per month of largemouth bass</p> <p>Adult men (16 yrs. or older): Six 8 ounce (uncooked weight) fish meals per month of largemouth bass</p>

\* Source identification and remediation actions have been developed through the Total Maximum Daily Load (TMDL) analysis process.



ADEQ is investigating opportunities to combine resources from multiple programs to determine the source, transport, and fate of historically used pesticides along the Gila River and its tributaries between Phoenix and Painted Rocks Lake. This study could be used to update the health risk assessment issued in 1991 by the Arizona Department of Health Services and to complete a TMDL analysis for these pesticides.

**National Mercury Fish Consumption Advisory** – In January 2001, EPA issued a national advisory concerning risks associated with mercury in freshwater fish for women who are pregnant or may become pregnant, nursing mothers, and young children. EPA is recommending that these most vulnerable groups limit fish consumption to one meal per week. That would be six ounces of cooked fish (eight ounces of uncooked fish) for an adult, and two ounces of cooked fish (three ounces uncooked) for a young child. US Food and Drug Administration has a companion advisory concerning the hazard posed by some fish purchased commercially (<http://www.cfsan.fda.gov>).

Nationally, mercury is thought to be introduced into water at higher than natural background levels due to air deposition. However, the main sources of mercury in Arizona are thought to be natural deposits, along with anthropogenic use of mercury. When mercury enters the water, biological processes transform it into the highly toxic form of methylmercury. Methylmercury accumulates in fish, with larger predatory fish generally accumulating higher levels of methylmercury. Methylmercury is a potent toxin, and babies of women who consume large amounts of fish when pregnant are at greater risk for changes in their nervous system that can affect their ability to learn.

**Further Investigations** – In cooperation with the Arizona Game and Fish Department, ADEQ has been investigating human health risks associated with eating fish caught in Arizona's lakes. Fish tissue samples have been collected and analyzed for mercury from the following lakes, which were chosen due to present or historic mining, the presence of predatory fish (e.g., largemouth bass, channel catfish, or northern pike), and recreational fishing activity:

- Bill Williams Watershed – Alamo Lake
- Colorado/Grand Canyon Watershed – Dogtown Reservoir
- Little Colorado-San Juan Watershed – Ashurst Lake, Fool's Hollow Lake, Lake Mary, Lyman Lake, Mormon Lake
- Middle Gila Watershed – Horsethief Basin Lake, Lynx Lake, Picacho Reservoir
- Santa Cruz-Rio Magdalena-Rio Sonoyta Watershed – Parker Canyon Lake
- Upper Gila Watershed – Dankworth Ponds, Roper Lake
- Verde Watershed – Goldwater Lake, Granite Basin Lake, Pecks Lake,

Results from this monitoring led to the fish consumption advisory issued in May 2002 for Upper and Lower Lake Mary, Parker Canyon Lake and Lyman Lake. Recent monitoring in support of the Lake Mary TMDL has discovered mercury in Soldier Annex, Soldier Lake and Long Lake and also led to advisories for all three of these lakes.

**Why do Fish Kills or Abnormalities Occur?** – Fish kills investigated by the Arizona Game and Fish Department and found to be due to a water quality concern are reported in Table 41 on the next page. Most of these fish kills were associated with highly productive (eutrophic or hypereutrophic) lakes. Although lake eutrophication is a natural process, it can be accelerated by human activities in the watershed or lake design. Fish kills caused by a reduction in water quantity (i.e., drought, dam releases) or because non-native game fish have been stocked in habitats that cannot support them, are not reported in Table 41.



*Lake Sierra Blanca experienced a fish kill in 1998 due to weed growth and high pH. It has been placed on the Planning List for further monitoring.*



**Table 41. Reported Fish Kills and Abnormalities – 1998-2002**

Surface Water and Size	Pollutant and Sources	Dates
<b>Little Colorado River-San Juan Watershed</b>		
Black Canyon Lake 37 acres AZL15020010-0180	Ash, debris and sediment from the <u>Rodeo-Chediski Fire</u> washing into the lake following monsoon rains resulted in a complete fish kill.	July 2002
Cholla Lake 130 acres AZL15020008-0320	Organic <u>bottom sediments</u> resuspended in the water column by the wind, caused low dissolved oxygen and a massive fish kill	July 2002
<b>Middle Gila Watershed</b>		
Canyon Creek 6 miles AZL15060103-014	Ash washing down the creek following the <u>Rodeo-Chediski Fire</u> killed all fish as well as all other aquatic life. Note that the damage was observed to extend farther downstream into tribal land.	July 2002
Cortez Park Lake 2 acres AZL15060106B-0410	<u>Herbicide applications</u> resulted in a massive die-off of aquatic vegetation. Associated low dissolved oxygen then killed approximately 2600 fish.	June 1999
Grand Canal 5 miles AZL15070102 - 250	Fish kill consisting entirely of carp occurred between 99 <sup>th</sup> and 107 <sup>th</sup> Avenues. Probable cause was dumping of <u>unknown substance</u> into canal.	2001
Salt River, below 91 <sup>st</sup> Ave. WWTP 5 miles AZL15060106B-001D	<u>Inadequate treatment</u> (lack of aeration and denitrophication) due to a power outage, resulted in an extensive fish kill in the Gila River and part of Buckeye Canal.	October 2000
<b>Salt Watershed</b>		
Crescent Lake 100 acres AZL15060101-0420	AGFD reports that due to <u>productivity (algal blooms)</u> , winter and summer fish kills have occurred on a very regular basis. The most recent was in 1998.	Winter 1998
Lake Sierra Blanca 30 acres AZL15060101-1390	Aquatic weed growth and subsequent <u>high pH</u> resulted in the death of approximately 100 rainbow trout.	June 1998

<b>Santa Cruz-Rio Magdalena-Rio Sonoyta</b>		
Arivaca Lake 120 acres AZL15050304-008	<u>Algal bloom</u> die off and resulting low dissolved oxygen killed 4000-5000 fish over a 4-day period in 1999. A smaller fish kill in 2000 was related to a storm inflow of water that suspended organic sediment loading in the lake and caused low dissolved oxygen.	June 1999 July 2000
<b>Upper Gila Watershed</b>		
Luna Lake 120 acres AZL15040004-0840	<u>Algal bloom</u> die-off, high pH, and low dissolved oxygen resulted in several hundred fish dying over a 16-day period.	July 1999
<b>Verde Watershed</b>		
Watson Lake 150 acres AZL15060202-1590	A blue-green <u>algae bloom</u> and high pH (9.5 - 9.8) associated with a fish kill. The algae is normally associated with lakes with high pH and elevated nutrients. It can produce a toxin that can kill fish.	July 2000
Whitehorse Lake 40 acres AZL15060202-1630	Low dissolved oxygen due to <u>algal bloom</u> die off, killed approximately 4000 fish. The majority of the dead fish were non-native black crappie young of the year.	July 1999

## VII. Ground Water Quality: Out of Sight Not Out of Mind

### How Does ADEQ Characterize Ground Water?

Ambient Ground Water Monitoring Program – ADEQ's Ambient Ground Water Monitoring Program has multiple objectives for its monitoring program. These objectives include:

Fulfill legislative mandates to monitor aquifers to detect the presence of new and existing pollutants, determine compliance with applicable water quality standards, determine the effectiveness of implemented Best Management Practices, evaluate the effects of pollutants on public health or the environment, and determine water quality trends;  
Characterize regional ground water quality;  
Determine impacts from specific anthropogenic (human caused) sources.

Ground water sampling is conducted by ground water basin to examine regional ground water quality. There are 51 ground water basins recognized by the Arizona Department of Water Resources. Since 1995, ADEQ has completed 10 ground water basin studies, has ongoing studies in 13 more basins, and intends to start three more basins this year (Figure 35). Data collected by this program are provided to the well owner and incorporated into ADEQ's Water Quality Database. A comprehensive report and a summary fact sheet are published for each basin studied. These can be obtained and downloaded from ADEQ's internet site at: [www.azdeq.gov](http://www.azdeq.gov). These studies are also reflected in the ground water quality monitoring maps provided in this report. Note that the wells sampled are not evenly distributed across the state. Areas where basin studies have been completed will have a much greater volume of data, whereas other areas may have little or no data at this time.

Selection of basins for investigation are based on a number of factors, including watershed rotation schedule (see Chapter VIII) and development pressures in the basin that may be impacting ground water quality. Systematic, grid-based random sampling is conducted to investigate potential nonpoint source pollution impacts on ground water quality. Higher density sampling occurs around targeted land uses to determine their affect on ground water quality.

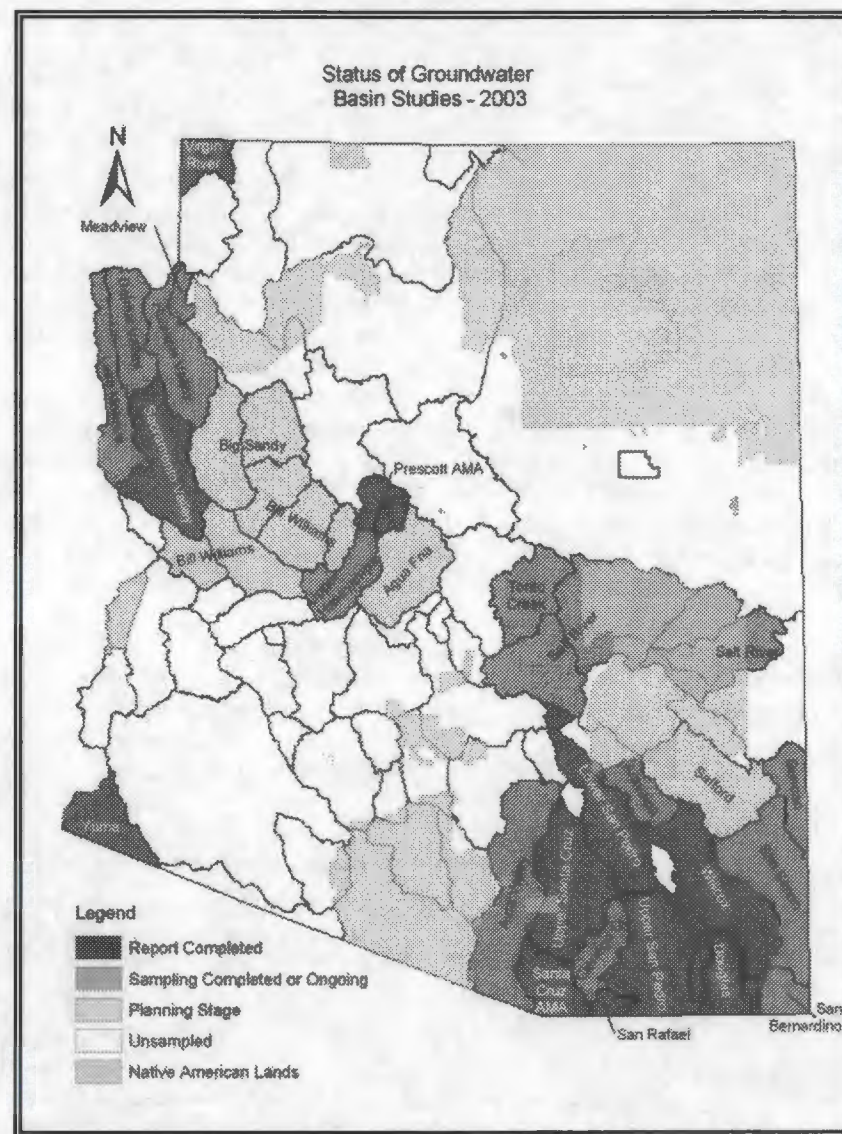


Figure 35. Ground Water Basin Studies



Basin studies are sometimes conducted in collaboration with other internal and external monitoring programs. The internal programs include the Pesticide Contamination Prevention Program, the Border Program (Mexico border), and the Aquifer Protection Permit Program. The U.S. Geological Survey has been ADEQ's external partner.

Inorganic constituents (see list in text box) are collected at each site, while samples for Volatile Organic Compounds (VOCs), pesticides on Arizona's Ground Water Protection List or banned pesticides, radionuclides, bacteria, perchlorate, and other constituents were collected in areas where these parameters are likely to be encountered. Samples for oxygen, hydrogen and nitrogen isotope analysis are collected at certain sites to assess aquifer recharge characteristics. Based on the ground water sampling results and statistical analysis, index wells are selected which will be re-sampled in the future to determine ground water quality change over time.

Inorganic Chemicals Tested			
Antimony	Beryllium	Cyanide	Nitrate
Asbestos	Cadmium	Fluoride	Nitrite
Arsenic	Chromium	Lead	Selenium
Barium	Copper	Mercury	Thallium

The Ambient Ground Water Monitoring Program provides important information to the public, including an overview of the ground water quality within a basin, areas where specific ground water quality problems can be expected to occur, and whether there has been any change over time in the ground water quality of the basin. This program is particularly important in evaluating effectiveness of nonpoint source pollution control by its broad, regional approach to monitoring and assessment of water quality.

**Pesticide Contamination Prevention Program** – This state-mandated program is intended to prevent contamination of ground water, soil, and the vadose zone from pesticides used in agriculture. The Ground Water Protection List, established in 1992, includes a list of 152 pesticide active ingredients that have the potential to pollute groundwater in Arizona. Another 37 pesticides are on the list of banned pesticides (e.g. DDT, chlordane, lindane). However, only 22 of the 189 pesticides listed or banned have an Aquifer Water Quality Standard (see text box).

#### Pesticides with Aquifer Water Quality Standards

Alachlor	Chlordane	2,4-D	Endothall	Glyphosate	Lindane	Picloram
Atrazine	Dalapon	Dinoseb	Endrin	Heptachlor	Methoxychlor	Simazine
Carbofuran	DBCP	Diquat	EDB	Heptachlor epoxide	Oxamyl	Silvex
						Toxaphene

The monitoring objectives for the Pesticides Contamination Prevention Program are:

- Determine whether these pesticide active ingredients or their metabolites are present or absent in the soil, vadose zone, or ground water;
- Determine whether an Aquifer Water Quality Standard has been exceeded; and
- Determine if ground or surface water pollution is occurring or has the potential to occur (soil contamination is usually an indicator) from general usage of pesticides.

Monitoring is aimed at providing an early detection to prevent further contamination; therefore, banned pesticides are not normally included in the analyses. Any detection of pesticides results in a follow up investigation, and if an exceedance is validated through follow-up monitoring, enforcement actions may be taken to mitigate the contamination. During the investigation, strict quality control samples (splits, duplicates and field spikes) are collected and tested.

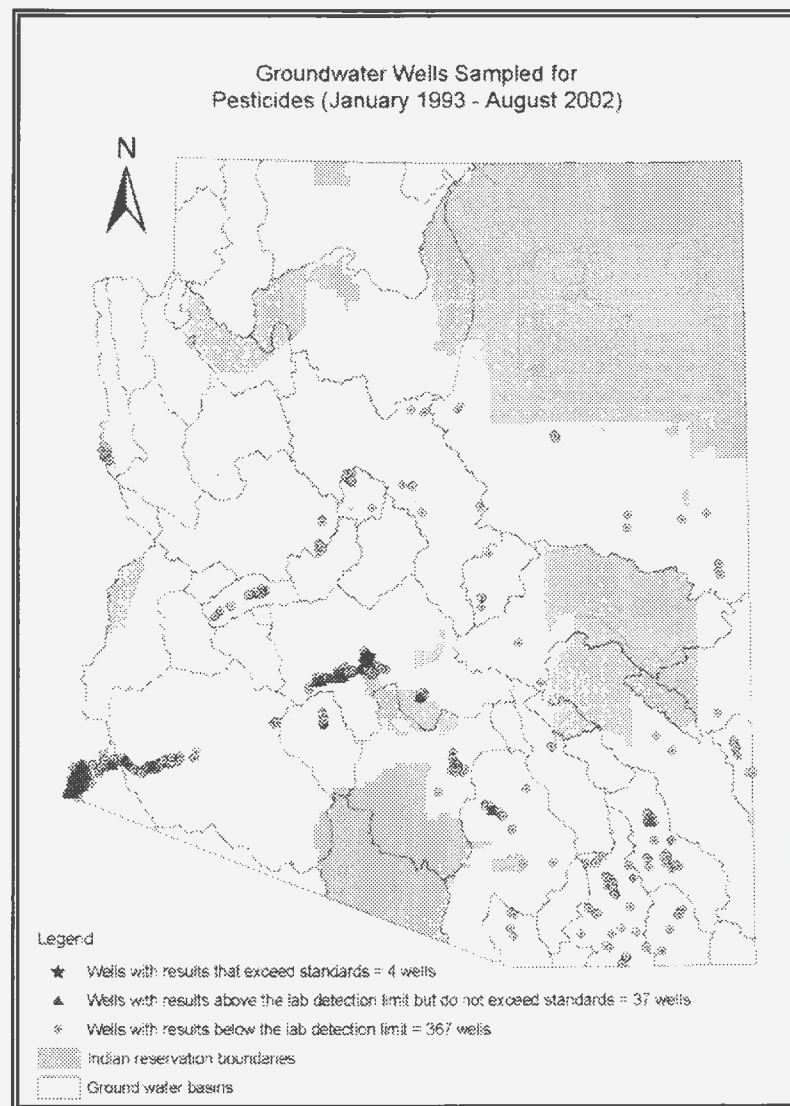
Monitoring results are compared to water quality standards and Arizona Department of Health Services' Human Health Based Guidance Levels for the Ingestion of Contaminants in Drinking Water and Soil and other standards. All data collected by this program are included in the 305(b) Report and the Annual Groundwater Quality Report to the Legislature. In addition, quarterly monitoring results are sent to the Arizona Department of Agriculture.

Wells monitored for pesticides during the past 10 years are shown on **Figure 36**. This map illustrates the following information about pesticides in Arizona:

- Pesticides were detected at levels higher than an Aquifer Water Quality Standard (stars on the map) in only one area. Dibromochloropropane (DBCP) was confirmed in three wells associated with citrus crops in 1994 in the Avondale area.
- Of the 407 wells monitored, pesticides have been detected in 41 wells (10%) (triangles and stars on the map).
- In 9% of the wells (37 wells), pesticides were detected but no pesticide standards were exceeded at these wells (triangles on the map), usually because no standard has been established for the pesticide detected.

Monitoring efforts were refocused in 1998 to two areas (Maricopa and Yuma counties) based on the results of the previous ten years of data collection. These areas have had intense agricultural activities, so they are sampled every other year with funding provided by EPA through the Department of Agriculture.

While the focus of the Pesticide Contamination Prevention Program has shifted to known areas of impact, through the ambient groundwater program, pesticide monitoring is still conducted in basin studies where land uses exist to suggest possible impacts.



**Figure 36. Pesticide Monitoring in Arizona**



## Ground water quality in Arizona

Most of Arizona's ground water meets Aquifer Water Quality Standards, and thus is suitable for drinking water use. However, there are some ground water quality concerns in Arizona. To provide a general evaluation of ground water quality, this report looks at six constituents in the ground water:

- Pesticides (already discussed in the previous section)
- Arsenic
- Fluoride
- Hardness
- Nitrate
- Radiochemicals (gross alpha and uranium)
- Total dissolved solids (TDS)

Only three of these constituents indicate anthropogenic sources of pollution to ground water when they are elevated (pesticides, TDS, and nitrate). The others are generally found at levels that are natural for ground water. However, most of them (except pesticides and nitrate) are frequently elevated near mining sites where a lot of soil disturbance has occurred, especially where acids have been added to leach out metals. A discussion is provided for each constituent to explain any concerns that may result from elevated concentrations in ground water.

**What the Maps Represent** -- What these maps really represent is determined by what data are stored in the database and how the database query is made. What is included and what is excluded is equally important in reviewing the maps that follow. Here are the important criteria used for these maps:

- Only data in ADEQ's Water Quality Database were used in constructing these maps. The Database primarily contains data collected by ADEQ's Ambient Ground Water Monitoring Program and the Pesticides Contamination Prevention Program, with a little data from U.S. Geological Survey, the Salt River Project, and the Arizona Department of Water Resources.
- Although some data from Superfund cleanup sites has been entered into the database, this query excluded these data so as to not bias the results towards the areas known to be heavily contaminated. In other words, a disproportionate number of wells were sampled in these areas, so it would appear that these contaminated wells make up a larger proportion

of the state than they actually do.

- The data query was made for 10 years, from January 1, 1993 through December 31, 2002.
- All of the wells monitored for a specified constituent were shown.
- Only the data from the last time the well was monitored for that constituent was used.
- Since wells are sampled for varying constituents, the total number of wells sampled for each constituent varies.
- All results reported as "less than" the laboratory reporting level or "non-detection" were considered to be in compliance with Aquifer Water Quality Standards.

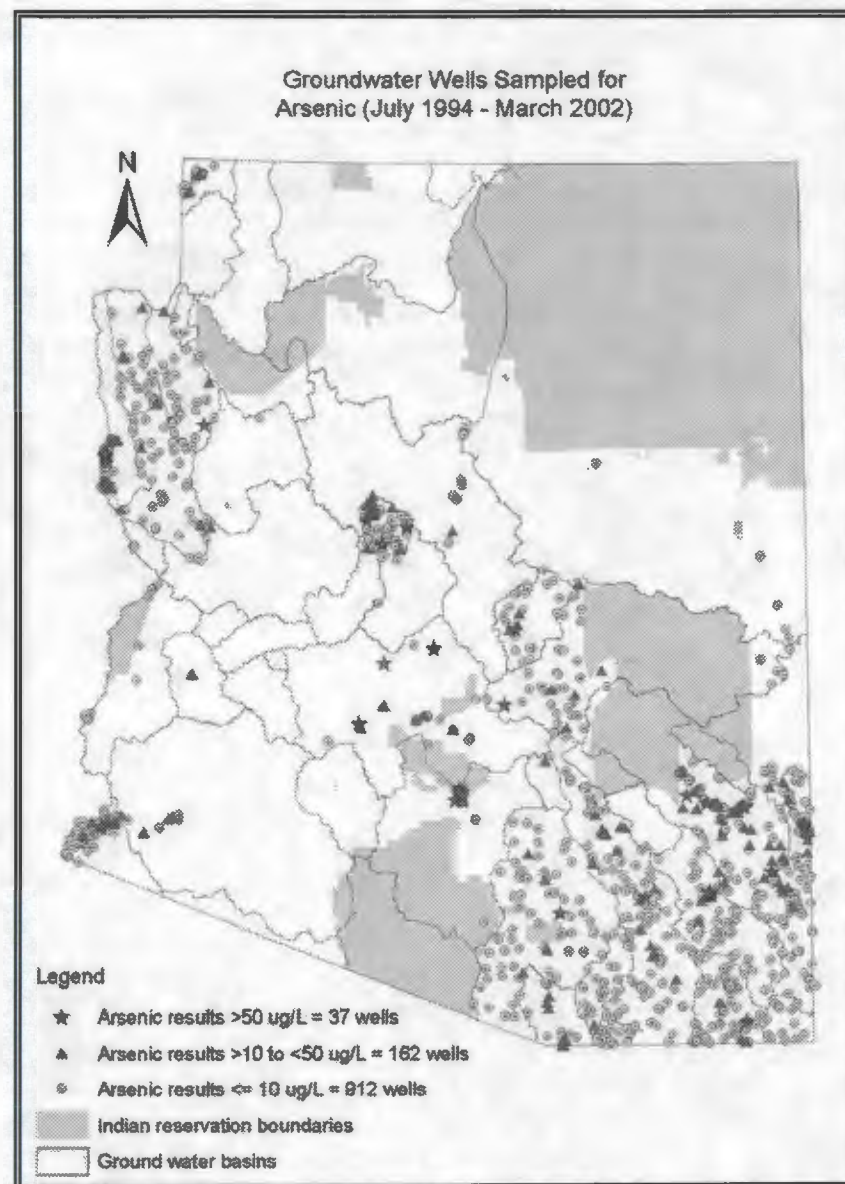
**Ground Water Standards** -- The Aquifer Water Quality Standards used in this assessment are shown in **Appendix C**. Generally these ground water standards are identical to the Safe Drinking Water Standards established for public water systems, as well as surface water standards for the Domestic Water Source designated use.

**Arsenic** – Arsenic is a trace element usually occurring naturally in Arizona's ground water. This constituent is of particular interest since EPA has lowered the health-based, drinking water standard associated with arsenic from 50 µg/L to 10 µg/L effective in 2006. Studies have linked long-term exposure to arsenic in drinking water to cancer of the bladder, lungs, skin, kidney, nasal passages, liver, and prostate. Non-cancer effects of ingesting arsenic include cardiovascular, pulmonary, immunological, neurological, and endocrine (e.g., diabetes) effects.

In general, arsenic can contaminate drinking water through natural processes, such as erosion of rocks and minerals. Arsenic can also contaminate drinking water when used for industrial purposes. Approximately 90 percent of industrial arsenic in the U.S. is currently used as a wood preservative, but arsenic is also used in paints, dyes, metals, drugs, soaps, and semi-conductors. Agricultural applications, mining, and smelting also contribute to arsenic releases in the environment. Arsenic is found at higher levels in underground sources of drinking water than in surface waters, such as lakes, reservoirs, and rivers.

Arsenic concentrations in wells sampled in Arizona between 1994 and 2002 is illustrated on **Figure 37**. The map shows that sampling activity was focused in ground water basins in the southeast and northwest parts of the state, with limited sampling in other parts of Arizona. The graphic reveals the following patterns related to arsenic:

- Generally, sample sites exceeding the present arsenic drinking water standard of 50 µg/L (stars on the map) are found in the Casa Grande area, along the San Simon River and Gila River in the southeastern Arizona, and in scattered areas of Maricopa County. Some exceedances are also present near the communities of Bullhead City, Prescott, and Willcox. Only 3% of wells sampled exceeded the present standard (50 µg/L)
- 15% of the wells sampled will exceed the new standard (10 µg/L) (triangles on the map).
- When the standard is 10 µg/L, the most numerous exceedances will occur in the same areas as occurred under the present arsenic standards; however, almost all areas of the state tested show some degree of arsenic exceedances over the new 10 µg/L standard (triangles on the map).



**Figure 37. Arsenic Concentrations in Arizona Wells**



Arsenic water quality exceedances occur in many different types of aquifers and many types of geology; however, they are most commonly found in soft, sodium-dominated waters that are located in chemically closed hydrologic systems. Thus, some of the most common places for arsenic exceedances are confined or artesian aquifers found in southeastern Arizona.

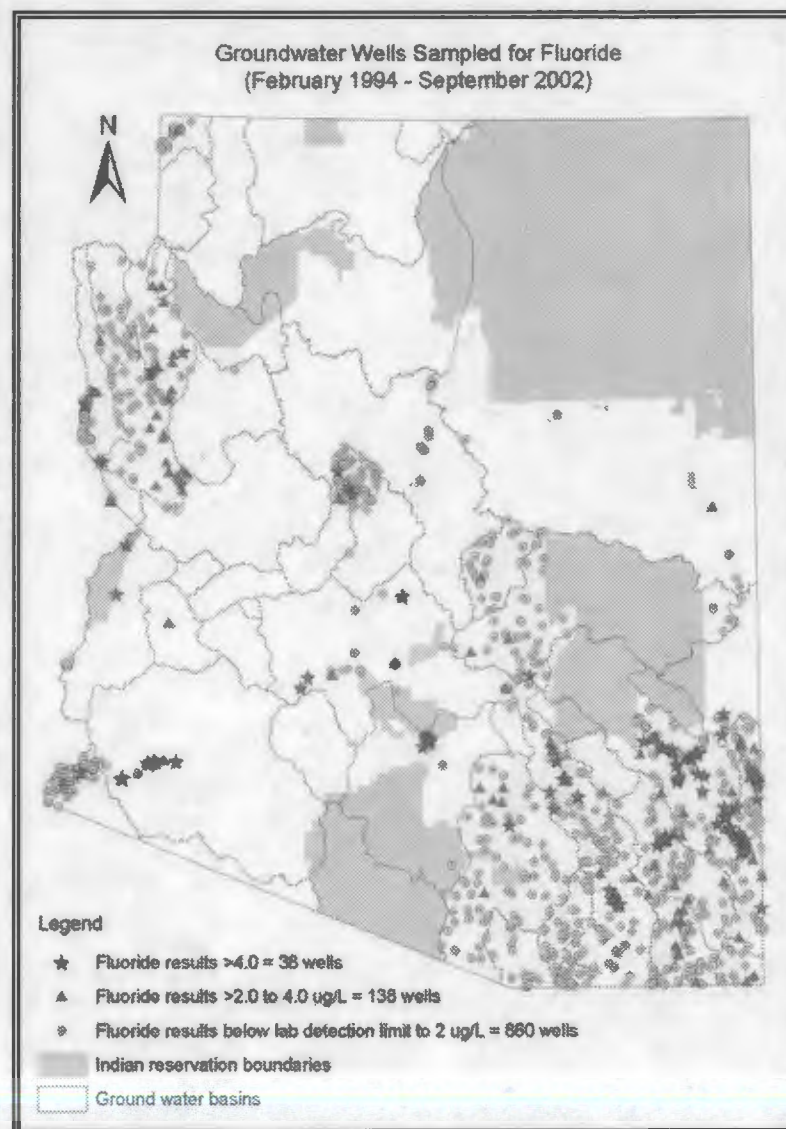
In a recent publication, *Technologies and Costs for Removal of Arsenic from Drinking Water*, EPA 2000, EPA reviews the types of treatment systems that can be used to remove arsenic. These can be grouped into four broad categories: precipitation process, adsorption process, ion exchange process, and separation (membrane) process. This document and more information about arsenic can be downloaded from EPA's website at [www.epa.gov/safewater/arsenic](http://www.epa.gov/safewater/arsenic).

**Fluoride** – Fluoride is another naturally occurring trace element in Arizona's ground water. Fluoride has both a health-based and an aesthetics-based water quality drinking standards associated. EPA has set a health-based water quality standard (or Primary Maximum Contaminant Level [MCL]) for drinking water at 4.0 mg/L. At concentrations higher than this standard, potential health effects include skeletal damage. The EPA has also set an aesthetic guideline (or Secondary MCL) at 2.0 mg/L, because higher levels may cause the mottling of teeth enamel.

Although fluoride at high levels is harmful, fluoride is essential for strong teeth and to prevent tooth decay; therefore, many municipal systems will add fluoride to the water (a process called fluoridation).

Fluoride levels in wells sampled between 1994 and 2002 is illustrated in Figure 38. The map reflects that sampling activity was focused in some ground water basins. This map indicates the following information about fluoride in Arizona:

- Fluoride monitoring was focused in ground water basins in the southeast and northwest parts of the state with limited sampling in other parts of Arizona.
- Approximately 4% of wells sampled by ADEQ exceeded the Primary MCL (4 mg/L) (stars on the map), while 17% of wells sampled exceeded the Secondary MCL water quality guideline (2 mg/L) (triangles on the map).



**Figure 38. Fluoride Concentrations in Arizona Wells**

- Generally, the highest fluoride levels are found in southeastern Arizona in the San Simon, Safford, Duncan, Willcox and San Pedro basins.
- In other parts of Arizona, fluoride concentrations are predominantly below both health and aesthetics-based water quality standards though isolated exceedances of both standards occur in northwestern Arizona and along the lower Gila River.

Most of these elevated levels are associated with confined or artesian aquifers that have chemically closed hydrologic systems. Calcium is an important control of higher fluoride concentrations. In these aquifers, calcium is removed from solution which may result in high concentrations of dissolved fluoride if a source of fluoride ions is available. High fluoride levels found in shallow floodplain wells is often attributed to upward water leakage from confined aquifers. Other sites in southeastern Arizona typically have fluoride concentrations below both health and aesthetics-based water quality standards.

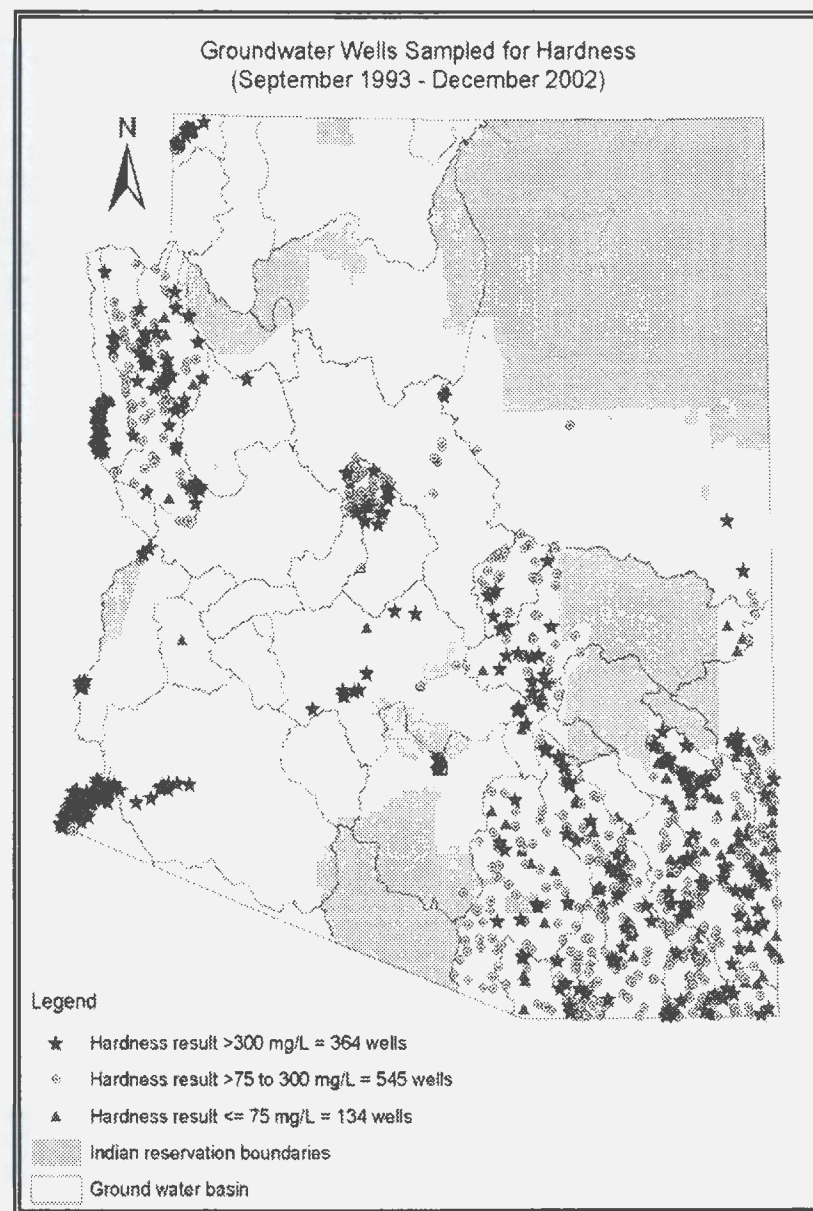
**Hardness** -- Hardness is an evaluation of certain chemical properties of water that originally represented the soap-consuming capacity of water. The term has now come to denote a more broad measure of the suitability of water for a number of domestic and industrial uses. Modern calculations of hardness usually report it as "calcium-carbonate hardness," which is a measure of the calcium and magnesium dissolved in the water. There are no health or aesthetic-based water quality standards for hardness.

Several hardness classifications exist, but the one most appropriate to Arizona waters is as follows:

- |                   |                   |
|-------------------|-------------------|
| • Soft            | (below 75 mg/l)   |
| • Moderately hard | (75 to 150 mg/l)  |
| • Hard            | (151 to 300 mg/l) |
| • Very hard       | (above 300 mg/l)  |

"Soft" water, or water low in calcium and magnesium concentrations with sodium as the dominant cation, is desirable for the lack of scale it produces and for other aesthetic reasons. However, soft water has some potentially negative effects as well. For example, when used for irrigation, soft water can potentially create a sodium hazard in the soil which is damaging to the soil structure, especially when high levels of total dissolved solids (TDS) are present.

The softest water is typically found in very deep wells which produce water from confined or artesian aquifers. In contrast to hardrock aquifers, confined aquifers



**Figure 39. Hardness Concentrations in Arizona Wells**



are often chemically closed hydrologic systems that favor the removal of calcium for sodium, producing the “soft” water. This type of soft water may also have elevated concentrations of trace elements such as fluoride and arsenic that may exceed health-based water quality standards.

In basin studies within Arizona, hardness concentrations are often significantly higher at wells located in mountain hardrock as compared with wells located in valley alluvium. Wells in mountain hardrock may have higher hardness concentrations because recharge water has traveled considerable distances underground through weathered, mineralized zones that may create elevated concentrations of dissolved salts and minerals.

The map showing hardness levels of groundwater sites in Arizona between 1993 and 2002 (**Figure 39**) illustrates the following about hardness concentration in Arizona:

- Sampling activity was focused on groundwater basins in the southeast and northwest parts of the state with limited sampling in other parts of Arizona.
- “Very hard” water is most common hardness level. Of the 1,043 groundwater sample sites:
  - 35% had “very hard” water (stars on the map),
  - 31% had “hard” water (circles on the map),
  - 21% had “moderately hard” water (also circles on the map), and
  - 13% had “soft” water (triangles on the map)
- “Very hard” water is particularly prevalent along the Virgin River near Littlefield, along the Gila River between Buckeye and Yuma, and the Colorado River between Bullhead City and Yuma. However, “very hard” water is found in many other areas throughout the state.
- In the northwest part of Arizona, in ground water basins around Kingman, ground water is generally “moderately hard” to “very hard.” The Prescott Active Management Area shows a similar pattern.
- In southeastern Arizona, groundwater sites are more equally divided among the four groups: “very hard,” “hard,” “moderately hard,” and “soft.”

The map reflects that sampling activity was focused some of the ground water

basins, with limited sampling in other parts of Arizona.

**Nitrate** – In Arizona, nitrogen typically occurs as nitrate because of the oxidizing nature of most ground water. EPA has set a health-based water quality standard (or Primary MCL) for nitrate (as nitrogen) at 10 mg/L. Drinking water containing nitrate above 10 mg/L (as nitrogen) (may also be measured as 45 mg/L nitrate, as nitrate) should not be consumed by young children or nursing mothers because of possible methemoglobinemia, or “blue baby” health effects.

Nitrate (as nitrogen) concentrations may be divided into the following categories:

- Natural background (< 0.2 mg/L)
- May or may not indicate human influence (0.2 to 3.0 mg/l)
- May result from human activities (3.0 to 10 mg/l)
- Probably results from human activities (> 10 mg/l)

Occurrences of nitrate over 3 mg/L is frequently due to anthropogenic sources such as agricultural practices, septic systems, and other sewage disposal practices. However, some very deep wells in relatively pristine areas have been sampled that have nitrate concentrations over 3 mg/l that probably stem from natural soil organic matter. Thus, careful study must be undertaken before assigning a specific cause to elevated nitrate concentrations.

**Figure 40** shows nitrate concentrations in wells sampled between 1994 and 2002. This map illustrates the following:

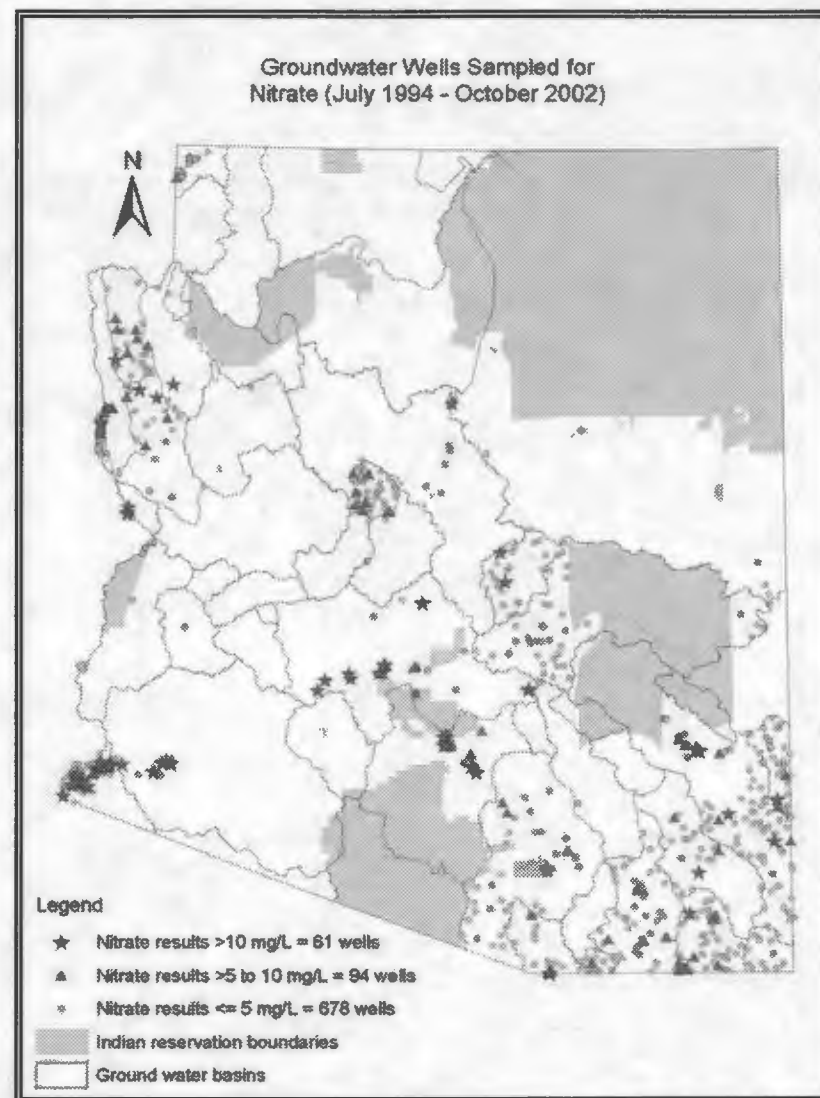
- Sampling was focused in ground water basins in the southeast and northwest parts of the state, with limited sampling in other parts of Arizona.
- Statewide, only 7% of wells sampled showed nitrate water quality standard exceedances (stars on the map).
- Generally, the highest nitrate concentrations tend to follow an arc starting in the Casa Grande area, through Buckeye, and finally through the lower Gila River area to Yuma. Fortunately, many of these elevated nitrate sites were sampled from shallow monitoring or irrigation wells that are not currently used for drinking water purposes.

- Other sites where nitrate exceeded health-based water quality standards are scattered around Arizona. Some of these can be attributed to shallow wells in other agricultural areas, monitoring wells in areas of dense septic systems use, or isolated windmills situated next to corrals. Most of these nitrate-impacted wells have a shallow depth to groundwater. Deeper wells, however, are not immune to anthropomorphic sources, especially where poor well construction and inadequate seals become routes for pollutants to directly enter the ground water.

**Radiochemicals (Gross Alpha and Uranium)** – Radioactive elements occur naturally in ground water across Arizona, though their concentrations can be dramatically altered by certain anthropomorphic activities such as hardrock mining. The most common radioactive parameters sampled by ADEQ include gross alpha and uranium. Each of these constituents has an associated health-based water quality standard, or Primary MCL. EPA has set a Primary MCL for gross alpha at 15 pCi/L and for uranium at 30  $\mu$ g/L for drinking water. At concentrations higher than these standards, potential health effects include various types of cancer and kidney toxicity.

**Figure 41** shows relative gross alpha and uranium concentrations in wells sampled between 1994 and 2002. This map illustrates the following information:

- Sampling activity was focused in some of the ground water basins, with limited sampling in other parts of Arizona.
- The map shows a much less dense number of radiochemical samples than other types of parameters. The likelihood of finding elevated radiochemicals, along with the cost of sample analyses, has focused the monitoring on a smaller number of wells within areas where radiochemical concentrations are suspected to be high. Radiochemical constituents are more likely to be elevated in mountainous, hardrock areas, particularly in granitic geology; therefore, samples are typically targeted in these areas of granite rock. Samples collected in areas of floodplain alluvium and/or basin-fill have only rarely shown the presence of elevated radiochemical constituents.



**Figure 40. Nitrate Concentration in Arizona Wells**



With this semi-targeting of sites, where radiochemical samples are collected, 20% of the wells had exceedances of either gross alpha or uranium standards (stars and triangles on the map).

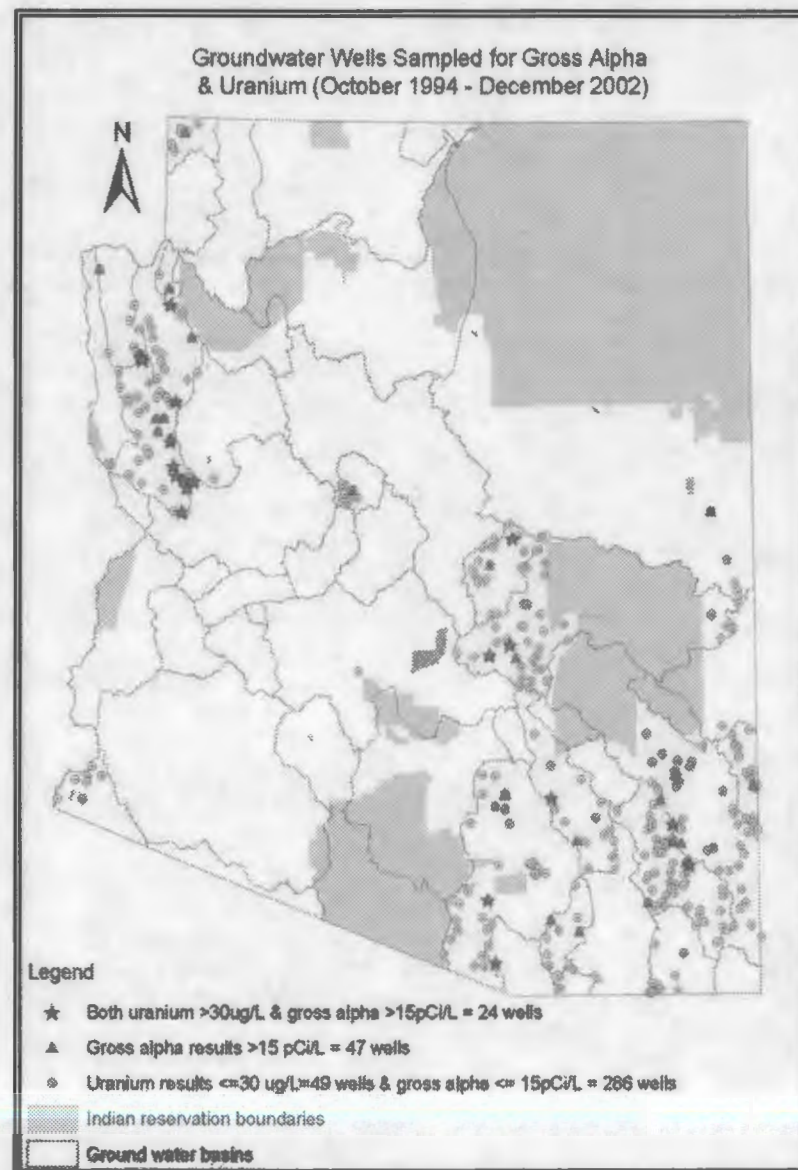
- Most of the uranium exceedances occur in the Kingman area of northwest Arizona, particularly in the granitic areas of the Cerbat and Hualapai Mountains. The highest concentrations are found near the old mining town of Chloride. In such mining areas, a significant amount of rock containing radioactive elements has been exposed.
- Sample sites in southeastern Arizona have shown occasionally elevated levels of both uranium and gross alpha. Again, most of these exceedances are associated with granitic geology, with the highest levels typically around historic mining areas, such as the community of Dos Cabezas in the Dos Cabezas Mountains.
- Other areas of the state, such as along the Virgin River, in the Prescott AMA, and near Yuma show few, if any, radiochemical standard exceedances.

**Total Dissolved Solids** – Total dissolved solids, or TDS, is a way to measure the salinity of water. It is the sum of the cations and anions. Thus, this constituent is important because it provides a quick “snapshot” of an area’s water quality. While there are no drinking water, health-based water quality standards associated with this constituent, there are both drinking water aesthetic-based water quality guidelines as well as guidelines for irrigation use.

The US Geological Survey classifies water according to the following scale:

- |                        |                        |
|------------------------|------------------------|
| • Fresh                | (below 1,000 mg/l)     |
| • Slightly saline      | (1,000 to 3,000 mg/l)  |
| • Moderately saline    | (3,000 to 10,000 mg/l) |
| • Very saline or briny | (> 10,000 mg/l).       |

EPA has set an aesthetic guideline for drinking water (Secondary Maximum Contaminant Level or SMCL) at 500 mg/l for TDS. The TDS levels in water at higher levels than the SCML may cause an unpleasant taste in drinking water.



**Figure 41. Gross Alpha and Uranium Concentrations in Arizona Wells**

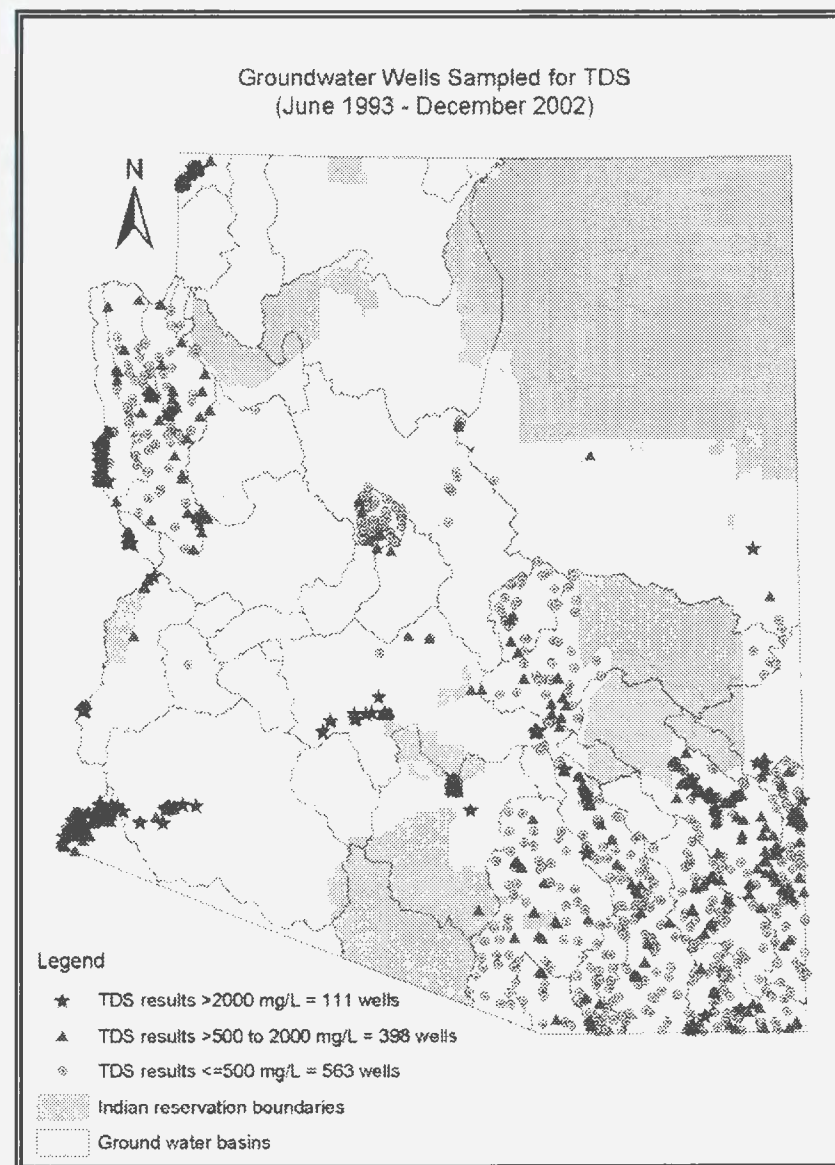
For irrigation purposes, the Salt River Project's annual water quality report recognizes that salinity has effects on crop yield according to the following scale:

- No problems with crop yield (< 500 mg/l)
- Increasing problems with crop yield (500 to 2000 mg/l)
- Severe problems with crop yield (> 2000 mg/l).

TDS levels in wells sampled between 1993 and 2002 is shown in **Figure 42**. This map illustrates the following information about TDS concentrations in Arizona:

- Sampling was focused in some of the ground water basins, with limited sampling in other parts of Arizona.
- Of the 1072 ground water sites sampled by ADEQ:
  - 53% had TDS concentrations below the Secondary MCL standard of 500 mg/L (circles on the map),
  - 37% were between 500 and 2,000 mg/L (triangles on the map), and
  - 10% were greater than 2,000 mg/L (stars on the map).
- Generally, the highest TDS levels are associated with agricultural areas along the Colorado, Gila, and Virgin rivers, as indicated by sampling near Buckeye, Fort Mohave, Littlefield, Safford, and Yuma (stars on the map).
- TDS levels in other parts of the state that were extensively sampled (such as southeastern Arizona, the Prescott AMA, and around Kingman) generally have levels below 2,000 mg/l, with the majority of sample sites below the 500 mg/l drinking water aesthetic guideline level.

Deterioration of ground water quality, as represented by increasing TDS levels, has been well documented in many studies. Salts present in the initial irrigation water applied become concentrated by evapotranspiration in the small amount of water that is recharged to the aquifer. These salt loadings on aquifers are exacerbated in river valleys, which typically have shallow ground water levels.



**Figure 42. TDS Concentrations in Arizona Wells**



## VIII. Taking Care of Water Quality Problems

### State and Federal Regulations

Federal and state laws provide a framework for comprehensive water quality protection. Three federal and state regulations provide the foundation for protecting Arizona's water resources:

- **The federal Clean Water Act** – establishes a national goal to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. This act was amended in 1987 to include state nonpoint source management programs that address reduction of pollution associated with activities that do not have end-of-pipe discharge points and can have discharges that are dispersed over large areas (e.g., agriculture, urban runoff).
- **The federal Safe Drinking Water Act** – requires that states develop programs to protect surface and ground water used for public drinking water systems through source water protection programs, and to ensure the delivery of safe water to these public systems.
- **The Arizona Environmental Quality Act** – gives ADEQ authority to develop state environmental protection programs for both surface and ground water (e.g., Aquifer Protection Permits, drywell registration, Pesticide Contamination Program, installation and remediation of Underground Storage Tanks and ground water monitoring).

This section will discuss the following programs established to identify and mitigate surface water quality problems in Arizona:

- The Nonpoint Source Program,
- Surface Water Monitoring,
- The Total Maximum Daily Load Program,
- Watershed Management, including volunteer monitoring, and the Grants and Outreach Program.

Many other water quality protection programs (e.g., permits, compliance and enforcement), also protect and mitigate water quality problems. Information about these programs can be obtained at ADEQ's web site: [www.azdeq.gov](http://www.azdeq.gov). The Ground Water Monitoring Program was discussed in Chapter VII.

### The Nonpoint Source Program

Early Clean Water Act programs concentrated on controlling point sources of pollution caused by discharges from large municipal and industrial sources. These programs achieved tremendous improvements in both ground water and surface water quality. Despite these accomplishments, much remains to be done to achieve the goals of the Clean Water Act and ensure that the nation's waters are "fishable" and "swimmable." In addition to point sources of pollution, Arizona's water resources continue to be impacted by nonpoint sources of pollution. Nonpoint source pollution is now considered the single largest cause of water pollution throughout the nation.

ADEQ works with federal, state, and local agencies, tribes, nonprofit organizations, the environmental community and local citizens to develop nonpoint source watershed management strategies to reduce nonpoint source pollution that degrades water quality. These management strategies rely on the cooperation of stakeholders that live within the watershed or have management responsibilities for the lands and the surface and ground water resources within. Arizona's Nonpoint Source Program relies on this type of cooperation, education and partnership as the primary method to reduce nonpoint source pollution and improve the state's water quality.

Arizona's Nonpoint Source Program focuses on the following land use activities that have been shown to negatively impact surface and ground water within the state:

Agriculture  
Forestry  
Urban runoff  
Hydromodification  
Onsite/septic waste treatment systems  
Mining  
Recreation

The Nonpoint Source Program aims to address water quality issues, educate the public to build a better understanding of the remaining water quality challenges and solutions, promote a public stewardship ethic and commitment, and encourage public involvement and support for watershed protection programs. Arizona's Nonpoint Source Program integrates the state's Clean Water Act and

Safe Drinking Water Act programs with voluntary incentives. ADEQ uses a combination of tools including: surface and ground water monitoring, watershed inventories, watershed characterizations, Total Maximum Daily Load (TMDL) studies, TMDL implementation plans, public drinking water system source water assessment plans, watershed-based plans, and water quality improvement projects to protect the state's water resources from nonpoint source pollution.

ADEQ's staff works closely with stakeholders to develop community-led, watershed-based planning efforts. These local planning efforts assist the Department in developing programs and outreach activities appropriate to the specific area and the issues. Since Arizona has a large amount of publicly owned lands, partnerships with federal, state and tribal land and resource management agencies are a key element in the program's success.

The other programs described in this chapter, along with the ambient Ground Water Monitoring Program described in Chapter VII, comprise the core of the Nonpoint Source Program administered in Arizona.



*Fences direct horses across Nutrioso Creek via a bridge to help reduce erosion of the streambanks and decrease sediment loads in the stream. The bridge and fences were constructed by a local rancher using water quality improvement grant funds awarded by ADEQ. The rancher has constructed off-channel drinkers as an alternate source of water for livestock.*

## Surface Water Monitoring

ADEQ's field personnel obtain water quality data that are used to assess the biological, chemical, and physical integrity of Arizona's rivers, streams, lakes, and reservoirs.

The primary objectives of this program are to provide credible data to support the following:

- Ongoing monitoring of the waters of the state as required by state law;
- Determination of water quality trends at long-term sites;
- Characterization of baseline water quality of surface waters located in selected watersheds according to the 5-year watershed monitoring schedule;
- Support for surface water quality assessments, identification of impaired surface waters, and the specific causes of impairment;
- Determination of compliance with applicable surface water quality standards;
- Determination of baseline water quality in the state's Unique Waters and whether water quality is being adequately protected or is being degraded; and
- Development of new water quality standards, especially for physical and biological integrity. For example, trend determination at regional biocriteria and habitat reference sites in support of bioassessments and to test indexes of biological integrity.

**Fixed Station Network Monitoring** – The core of the ambient water quality monitoring program is ADEQ's Fixed Station Network (FSN). This monitoring program's primary purpose is to characterize baseline water quality of perennial, wadeable streams and to provide data to determine long-term water quality trends. This program incorporates longer monitoring time frames (more than 20 years) and lower site densities than the Watershed Characterization Monitoring Program. ADEQ fixed sampling sites are sampled quarterly each year. Long-term fixed station sites have been established on wadeable, perennial streams in nine of the ten major watersheds in the state. USGS provides the fixed station sites in the 10<sup>th</sup> watershed -- the Colorado - Grand Canyon Watershed (see USGS below). Currently there are 28 ADEQ fixed station sites (Figure 43).



### Analytical Suite

Analytes being tested will vary based on the monitoring purpose. The following suite of analytes are collected at ambient monitoring sites:

**Field data:** Dissolved oxygen, pH, specific conductance, stream flow, turbidity, air temperature, water temperature, site characteristics, photographs. For lakes add redox, secchi depth, depth (not flow), and chlorophyll a.

**General chemistry:** Specific conductance, pH, calcium, magnesium, sodium potassium, chloride, sulfate, fluoride, turbidity, total dissolved solids, total suspended solids, hardness, carbonate, bicarbonate, alkalinity (total and phenolphthalein). For lakes add chlorophyll a and algae identification.

**Nutrients:** Ammonia (as nitrogen), phosphorus (total as phosphorus), nitrate/nitrite (total as nitrogen), total Kjeldahl nitrogen.

**Metals:** Antimony, arsenic, barium, beryllium, boron (total), cadmium, chromium, copper, lead, mercury, manganese (total), selenium, zinc.

**Bacteria:** *Escherichia coli*.

In addition, suspended sediment concentration will be collected at all future ambient stream sites.

**USGS Cooperative Fixed Station Network Monitoring** -- For a number of years, ADEQ has participated in a joint funding agreement with the U.S. Geological Survey to operate the Cooperative Fixed Station Network monitoring program (USGS Co-op Program). The USGS conducts water quality monitoring at 19 USGS Co-op Program sites located on Arizona's larger rivers, which are of a size and annual flow that precludes ADEQ staff from the ability to monitor (Figure 43). USGS also maintains gage stations at these sites. Water quality data are collected quarterly at sites located on the Colorado River, Salt River, Gila River, Bill Williams River, and the Verde River.

**Watershed Characterization Monitoring** -- ADEQ has identified 10 major surface watersheds in Arizona. In 1998, ADEQ adopted a rotational watershed framework in which staff conducts water quality monitoring in wadeable, perennial streams located in two watersheds each year. All 10 watersheds are monitored over a 5-year cycle. The watershed schedule is shown in Table 42.

**Table 42. Arizona's watershed cycle**

WATERSHEDS	FOCUS YEARS 1999 - 2011										
	99	00	01	02	03	04	05	06	07	08	09
Bill Williams					X					X	
Colorado - Lower Gila					X						X
Colorado - Grand Canyon						X*					X
Little Colorado - San Juan			X					X			
Middle Gila				X					X		
Salt				X					X		
San Pedro - Willcox Playa - Rio Yaqui		X					X				X
Santa Cruz - Rio Magdalena - Rio Sonoyta			X					X			
Upper Gila		X					X				X
Verde	X					X				X	

Note: Staff conduct watershed monitoring on the state fiscal year calendar, which starts July 1st and ends June 30<sup>th</sup> of the following calendar year. For example, 2004 starts on July 1, 2003 and ends June 30, 2004.

\*Monitoring in the Colorado-Grand Canyon Watershed was deferred in 2004 due to budget constraints.

The purpose of this monitoring is to obtain basic water quality data on streams and lakes in each watershed. Along with the analytical samples collected (see analytical suite text box), annual bioassessments and habitat assessments are made each spring to assess the health of the aquatic communities in wadeable, perennial streams.

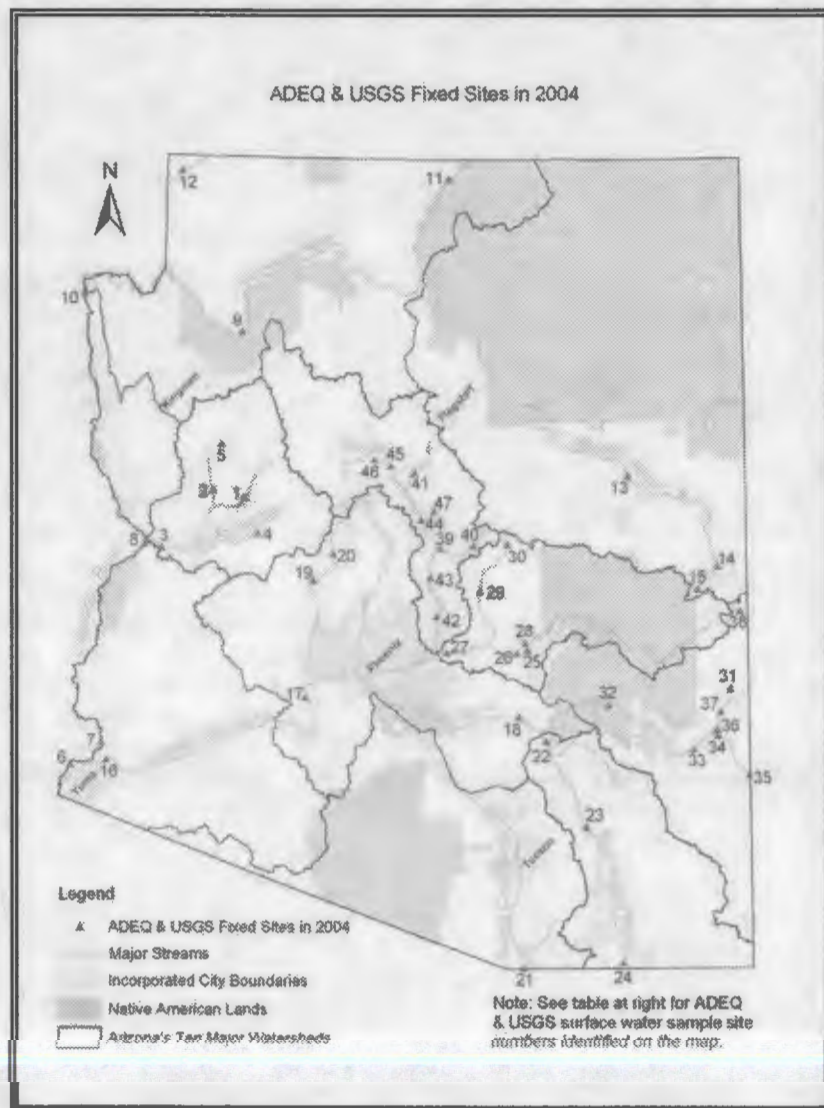


Figure 43. Fixed long-term monitoring sites

MAP #	STREAM NAME	SITE DESCRIPTION	AGENCY
1	Burro Creek	at Six Mile Crossing	ADEQ
2	Big Sandy River	above Highway 93 bridge	ADEQ
3	Bill Williams River	near Mineral Wash	ADEQ/USGS
4	Santa Maria River	below Highway 93 bridge	ADEQ
5	Trout Creek	near Wikieup	ADEQ
6	Colorado River	at Mexico above Morelos Dam	ADEQ/USGS
7	Colorado River	above Imperial Dam	ADEQ/USGS
8	Colorado River	below Parker Dam	ADEQ/USGS
9	Colorado River	above Diamond Creek	USGS
10	Colorado River	below Hoover Dam	USGS
11	Colorado River	at Lee's Ferry	ADEQ/USGS
12	Virgin River	at Littlefield	USGS
13	Little Colorado River	at Woodruff	ADEQ
14	Little Colorado River	below Springerville	ADEQ
15	West Fork Little Colorado River	at Govt Springs near Greer	ADEQ
16	Gila River	near Dome	ADEQ
17	Gila River	above Gillespie Dam diversions	ADEQ/USGS
18	Gila River	at Kelvin	ADEQ/USGS
19	Hassayampa River	at Box Canyon near Wickenburg	ADEQ
20	Hassayampa River	below Milk creek near Wagoner	ADEQ
21	Nogales Wash	at Morley Ave. Tunnel	ADEQ
22	San Pedro River	near Dudleyville	ADEQ
23	San Pedro River	at Cascabel	ADEQ
24	San Pedro River	at Palominas	ADEQ
25	Pinal creek	at Inspiration Dam	ADEQ
26	Pinto Creek	above Henderson Ranch Ford	ADEQ
27	Salt River	below Stewart Mountain Dam	ADEQ/USGS
28	Salt River	near Roosevelt Lake	ADEQ/USGS
29	Tonto Creek	above Gun Creek	ADEQ
30	Tonto Creek	below Christopher Creek	ADEQ
31	Blue River	at Juan Miller Road crossing	ADEQ
32	Gila River	near Calva	ADEQ/USGS
33	Gila River	at head of Safford Valley	ADEQ/USGS
34	Gila River	at Old Safford Bridge	ADEQ
35	Gila River	near Duncan	ADEQ
36	San Francisco River	below Clifton	ADEQ
37	San Francisco River	above Clifton	ADEQ
38	San Francisco River	above Luna Lake near Alpine	ADEQ
39	East Verde River	near Childs	ADEQ/USGS
40	East Verde River	at Perkinsville Bridge	ADEQ
41	Oak Creek	at Red Rock Crossing	ADEQ
42	Verde River	below Bartlett Dam	ADEQ/USGS
43	Verde River	below Tangle Creek	ADEQ/USGS
44	Verde River	at Beasley Flat	ADEQ
45	Verde River	near Clarkdale	ADEQ/USGS
46	Verde River	at Perkinsville Bridge	ADEQ
47	West Clear Creek	near Camp Verde	USGS



**Unique Waters** – As resources allow, surface water quality data are collected on Arizona's outstanding state resource waters or "Unique waters" during the Watershed Characterization Monitoring. Currently, there are 18 Unique Waters in Arizona. The goal of this program is to acquire enough water quality data to determine water quality trends in these Unique Waters, and therefore, determine whether state antidegradation requirements are being met (i.e., is water quality improving, being maintained, or degrading).

**Biocriteria Program** – Bioassessment data are collected to support the development of Arizona's biocriteria program. ADEQ began research to develop a state biocriteria program in 1992, focusing on using macroinvertebrate communities to assess the biological health of the aquatic system. A warmwater and a coldwater Index of Biological Integrity has been developed for Arizona through this research. Currently, the Biocriteria Program monitoring effort is to test existing indices of biological integrity for warmwater and coldwater streams over a range of impaired conditions and sources of stressors.

Bioassessments and habitat assessments are conducted at biocriteria reference sites, ADEQ FSN sites, watershed sites, and unique water sites to develop Arizona's regional reference site network statewide and to monitor trends in reference conditions over time. The goal is to conduct bioassessments at a minimum of 10 biocriteria reference sites in each watershed each water year. Benthic macroinvertebrate samples in wadeable, perennial streams with suitable riffle habitats are collected during the spring index period (April, May, or June).



*An ADEQ staff member conducts macroinvertebrate sampling with a kick net on the Little Colorado River near Springerville, Arizona.*

Water Quality Improvement Programs

**Lakes Program** – Data and information on lake and reservoir water quality are collected by a team of field staff to identify water quality problems and determine potential sources of pollution. The overall objectives of the Lakes Program are to evaluate the water quality status of lakes and reservoirs by identifying natural and human-induced conditions affecting lake water quality and to develop feasible ways to maintain, protect, and restore lake water quality. Biological (algae and chlorophyll), chemical, and physical limnology data are collected to characterize baseline water quality conditions.

The Lakes Program also follows the 5-year watershed monitoring schedule to organize its monitoring activities. Monitoring resources are focused on lakes and reservoirs located within the two major watersheds that are identified for study each water year. The Lakes Program monitoring activities incorporate four basic approaches:

- Baseline water quality monitoring and assessment;
- Targeted monitoring to fill assessment gaps identified on the Planning List;
- TMDL analyses to diagnose and recommend the most feasible ways to improve lake water quality; and
- A criteria development project to classify lakes, that will lead to class-specific water quality standards to protect the lake resources.

**Targeted Monitoring From the Planning List** - The Planning List that is generated during the assessment process identifies monitoring data gaps. Those waters with an overall ranking of high would be scheduled for monitoring in the two years following assessment report. Medium or low priority waters would be addressed in the subsequent three years, with the objective of having sufficient monitoring data on all waters on the Planning List within the current five-year watershed cycle. However, the current drought in Arizona may delay obtaining sufficient data during critical conditions on some waters on the Planning List.

Targeted monitoring focuses efforts on those surface waters that show the most potential for impairment. These intensive monitoring efforts are designed to ensure monitoring captures seasonality, spatial and temporal variations, and suspected critical loading conditions.

The factors used to prioritize TMDLs are similarly used for the Planning List, except that no designated uses have been assessed as "impaired." Planning List prioritization considers:

The number of exceedances compared to the number of samples taken,



and the potential for completing the sample collection necessary to make an assessment;  
Whether there are critical conditions (season, precipitation, activity in the watershed) when exceedances occur, so that sample collection is scheduled when these conditions are represented;  
Watershed monitoring rotation, when listed due to insufficient data rather than exceedances;  
Development of comprehensive watershed management plans; and  
Whether the surface water has been on the 303(d) List in the past.

## **Total Maximum Daily Load (TMDL) Program**

ADEQ's TMDL Program must develop Total Maximum Daily Loads for each surface water identified as impaired. TMDLs must be initiated for surface waters identified as "high priority" within the first two years following list approval by EPA. All other waters ranking medium or low priority are scheduled for TMDL development within the next two 5-year watershed cycle. However, the fact that Arizona is in the fifth year of a drought poses a significant obstacle to the completion of scheduled TMDLs. Some impaired waters may flow only during precipitation events and have water quality problems which only appear during heavy storms.

### **A Total Maximum Daily Load Analysis (TMDL)**

A TMDL is a written, quantitative plan and analysis to determine, on a pollutant specific basis, the maximum loading a surface water can assimilate and still attain and maintain a specific water quality standard during all conditions. The TMDL allocates the loading capacity of the surface water to point sources and nonpoint sources identified in the watershed, accounting for natural background and seasonal variation, with an allocation set aside as a margin of safety.

TMDL development leads to identification of a surface water load and waste load capacity for each pollutant. The final TMDL includes point source (waste load) allocations, nonpoint source (load) allocations, and load reductions necessary for attainment of water quality standards based on the critical conditions for loading. Records review, stakeholder interviews, field reconnaissance, field measurements, and modeling are performed to better understand the location, magnitude, and conditions causing the impairment. This process ultimately leads to an understanding of what needs to be done to reduce and prevent the impairment, and how long it might take the surface water to attain water quality standards.

The TMDL analysis starts with identification of the pollutants of concern and the water quality standards that must be attained to protect designated uses. Pollutant-specific numeric targets are set based on the most stringent water quality standard applicable to the surface water.

Source analysis then identifies the location and magnitude of point source and nonpoint source loadings. Point source waste loads are from discrete conveyances of discharge directly to a surface water (i.e. wastewater treatment plant outfall). Nonpoint source loads are from non-discrete discharges, including runoff generated by activities such as grazing, agriculture, mining and forestry. The TMDL also establishes the naturally occurring "background conditions" of the watershed, which are included in the nonpoint source load category.

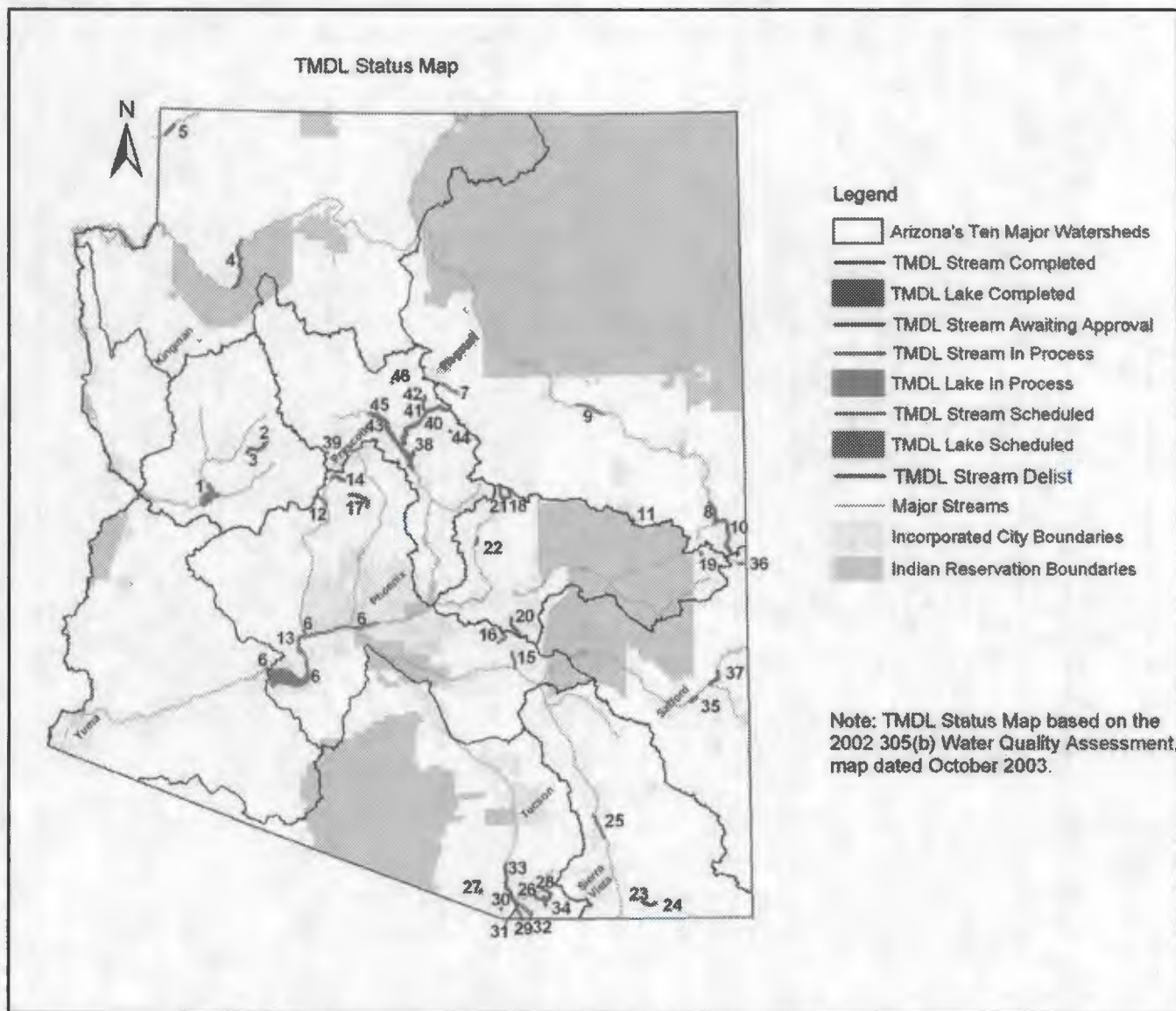
A pollutant specific load capacity, which includes a margin of safety, is calculated based on flow characteristics and the numeric target (generally the applicable surface water quality standard). When the load capacity and sum of the sources' contributions during the critical condition are compared, load allocations and necessary load reductions can be determined.

Waste load reductions from point sources can be managed through permitting programs such as Arizona's Pollutant Discharge Elimination System (AZPDES). However, there are no regulatory programs for nonpoint pollution, so load reductions from these sources are strictly voluntary. In Arizona, most surface water impairment is a result of nonpoint source pollution. Nonpoint source pollution may include excessive sediment caused by the denudation of grasslands, the location of roads, construction, bacteria from wildlife and/or recreation, metals from historic mining practices and road cuts through ore bodies, and pesticides from historic agricultural practices.

Stakeholders are encouraged to participate throughout the TMDL process. For most impaired surface waters, achievement of water quality standards will occur through voluntary efforts such as participation in watershed management groups, volunteer monitoring, pursuit of funding for cleanup measures, and education.

The status of surface waters on Arizona's 2002 303(d) List is illustrated in Figure 44 on the next pages.





**Figure 44. Status of TMDLs in Arizona (see following table for waterbody names)**

### Status of TMDL Development from 1998 - 2003 (for Figure 44)

Map #	Surface Water Name Segment Description Waterbody ID	Pollutants of Concern Causing Impairment	TMDL Status
<b>Bill Williams Watershed</b>			
1	Alamo Lake AZL15030204-0040	Mercury in fish tissue, high pH, sulfide, dissolved oxygen	In process. Delisting sulfide (change in standard). Delisting dissolved oxygen (attaining standards)
2	Boulder Creek, headwaters - Wilder Creek AZ15030202-006B	Fluoride	Delisting fluoride (change in standard)
3	Boulder Creek, Wilder Creek - Copper Creek AZ15030202-005A	Arsenic, copper, zinc	Awaiting EPA approval of TMDL
<b>Colorado - Grand Canyon Watershed</b>			
4	Colorado River, Parashant - Diamond Creek AZ15010002-003	Turbidity	Delisting turbidity (change in standard)
5	Virgin River, Beaver Dam Wash - Big Bend Wash AZ15010010-003	Turbidity, fecal coliform	Delisting turbidity and fecal coliform (changes in standards)
<b>Colorado - Lower Gila Watershed</b>			
6	Painted Rocks Borrow Pit Lake AZL15070201-1010	DDT metabolites, toxaphene, chlordane, low dissolved oxygen, fecal coliform	Scheduled. Delisting fecal coliform (change in standards)
<b>Little Colorado - San Juan Watershed</b>			
7	Lake Mary (upper) AZL15020015-0900 Lake Mary (lower) AZL15020015-0890	Mercury in fish tissue	In process
8	Little Colorado River, Water Canyon - Carnero Wash AZ15020001-009, -010	Turbidity	Complete
9	Little Colorado River, Porter Tank - McDonalds Wash AZ15020008-017	Copper, silver	In process
10	Nutriso Creek, headwaters - Little Colorado River AZ15020001-017, -015	Turbidity	Complete
11	Rainbow Lake AZL15020005-1170	Nitrogen, phosphorus, pH	Complete
<b>Middle Gila Watershed</b>			
12	French Gulch, headwaters - Hassayampa River AZ15070103-239	Copper, manganese, zinc	In process. Delisting manganese (change in standards)
6	Gila River, Salt River to Painted Rock Res. AZ15070101-015, -014, -010, -009, -008, -007, -005, -001 Salt River, 23 <sup>rd</sup> Ave WWTP - Gila River AZ15060106B-001D Hassayampa River Below Buckeye Canal AZ15070103-001B Painted Rock Reservoir AZL15070101-1020	DDT metabolites, toxaphene, chlordane	Scheduled
13	Gila River, Centennial Wash - Gillespie Dam AZ15070101-008	Boron (Also included in list above for pesticides)	Scheduled
14	Hassayampa River, headwaters - Copper Creek AZ15070103-007	Cadmium, copper, zinc	Complete
15	Mineral Creek, Devils Canyon - Gila River AZ15050100-012B	Copper	In process
16	Queen Creek, headwaters - Superior Mine WWTP AZ15050100-014A	Copper	In process
17	Turkey Creek, headwaters - Poland Creek AZ15070102-036B	Cadmium, copper, zinc	In process



Map #	Surface Water Name Segment Description Waterbody ID	Pollutants of Concern Causing Impairment	TMDL Status
<b>Salt Watershed</b>			
18	Christopher Creek, headwaters - Tonto Creek AZ15060105-353	Turbidity	Delisting turbidity (change in standards)
19	Crescent Lake AZL15060101-0420	pH	Scheduled
20	Pinto Creek, headwaters - Ripper Springs AZ15060103-018	Copper	Completed. Phase II TMDL in process (shown as complete)
21	Tonto Creek, headwaters - Haigler Creek AZ15060105-013	Turbidity	Delisting turbidity (change in standards)
22	Tonto Creek, Rye Creek - Gun Creek AZ15060101-008	Turbidity	Delisting turbidity (change in standards)
<b>San Pedro - Willcox Playa - Rio Yaqui Watershed</b>			
23, 24	Mule Gulch, headwaters - Whitewater Draw AZ15080301-090A, -090B	Copper, zinc, low pH.	In process. (Reach has subsequently been resegmented.)
25	San Pedro River, Dagoon Wash - Tres Alamos Wash AZ15050202-002	Nitrate	Scheduled
<b>Santa Cruz - Rio Magdalena - Rio Sonoyta Watershed</b>			
26	Alum Gulch, headwaters - ephemeral reach AZ15050301-581A, -581B	Cadmium, copper, zinc, pH.	Complete
27	Arivaca Lake AZ15050304-0080	Mercury	Complete
28	Harshaw Creek, headwaters - ephemeral reach AZ15050301-025	Copper, zinc, low pH	Complete
29	Nogales and East Nogales Washes, Mexico border - Potrero Creek AZ15050301-011	Chlorine, turbidity, fecal coliform	Scheduled. Delisting fecal coliform (change in standard)
30	Pena Blanca Lake AZL15050301-1070	Mercury	Complete
31	Potrero Creek, Interstate 19 - Santa Cruz River AZ15050301-500B	Fecal coliform	Delisting fecal coliform (change in standard)
32	Santa Cruz River, Mexico border - Nogales International WWTP discharge AZ15050301-010	Escherichia coli, fecal coliform	Scheduled. Delisting fecal coliform (change in standard)
33	Santa Cruz River, Nogales International WWTP discharge - Josephine Canyon AZ15050301-009	Fecal coliform	Delisting fecal coliform (change in standard)
33	Santa Cruz River, Josephine Canyon - Tubac Bridge AZ15050301-008A	Fecal coliform, turbidity.	Delisting fecal coliform and turbidity (changes in standards)
33	Santa Cruz River, Tubac Bridge - Sopor Wash AZ15050301-008B	Fecal coliform	Delisting fecal coliform (change in standard)
34	Three R Canyon, headwaters - ephemeral segment AZ15050301-558A, -558B, -558C	Cadmium, copper, zinc, pH.	Complete

Map #	Surface Water Name Segment Description Waterbody ID	Pollutants of Concern Causing Impairment	TMDL Status
<b>Upper Gila Watershed</b>			
35	Gila River, Bonita Creek - Yuma Wash AZ15040005-022	Turbidity	Delisting turbidity (change in standard)
36	Luna Lake AZL15040004-0840	Dissolved oxygen, nitrogen, phosphorus, pH	Complete
37	San Francisco River, Limestone Gulch - Gila River AZ15040004-001	Turbidity	Delisting turbidity (change in standard)
<b>Verde Watershed</b>			
38	Beaver Creek, Dry Beaver-Verde River AZ15060202-002	Turbidity	Delisting turbidity (change in standard)
39	Granite Basin Lake AZL15060202-0580	Dissolved oxygen	Delisting (Investigation showed low dissolved oxygen was due to natural conditions during lake turnover).
40	Munds Creek, headwaters -Oak Creek AZ15060202-415	Nitrogen, phosphorus	Complete
40	Oak Creek, headwaters - Verde River AZ15060202-019, -018A, -018C, -017, -018	Nitrogen, phosphorus	Complete
41	Oak Creek, at Slide Rock State Park AZ15060202-018B	<i>Escherichia coli</i> , fecal coliform	Complete
42	Oak Creek, West Fork Oak Creek-Dry Creek AZ15060202-018A, B, and C	Turbidity	Delisting turbidity (change in standard and designated use)
43	Pecks Lake AZL15060202-1060	Dissolved oxygen, pH	Complete
44	Stoneman Lake AZL15060202-1490	Dissolved oxygen, pH	Complete
45	Verde River, unnamed tributary (15060202-065) - West Clear Creek AZ15060202-037, -025, -015, -001, and AZ15060203-027	Turbidity	Complete
46	Whitehorse Lake AZL15060202-1630	Dissolved oxygen	In process

Note that the map and table:

- Report on TMDLs completed after 1998
- Do not reflect 2004 303(d) Listing being sent to EPA, except where noting delisting,
- Show status on the map as "delist" only if all parameters are to be removed from the 303(d) List, while table may indicate that a parameter is being removed while others are remaining.
- Show status on the map as "complete," although the table indicates a Phase II TMDL has been initiated.



## Watershed Management

ADEQ focuses on six watershed management activities, which will be discussed in this section:

- & Development of water quality watershed-based management plans and watershed characterization studies, currently through the Nonpoint Source Education for Municipal Officials (NEMO) Project;
- & Development of TMDL implementation plans;
- & Coordination with local watershed groups across Arizona who are actively developing and implementing watershed-based plans and TMDL implementation plans;
- & Volunteer monitoring
- Grants and outreach for available Water Quality Improvement Grants; and
- & Regional 208 water quality planning.

Further information about these programs can be obtained at ADEQ's web site: <http://www.adeq.state.az.us>.

**Watershed-based Management Plans and the NEMO Project** -- Based on EPA guidance (*Supplemental Guidelines for the Award of Section 319 Nonpoint Source Grants to States and Territories in FY 2003*), watershed-based plans must include nine key elements. Where the watershed-based plan is designed to implement a TMDL, these elements help provide reasonable assurance that the nonpoint source load allocations identified in the TMDL will be achieved. However, even if a TMDL has not yet been completed, EPA believes that these nine elements are critical to assure that public funds to address impaired waters are used effectively.

In broad terms, the elements that EPA requires for a watershed based plan are:

- |            |                                    |
|------------|------------------------------------|
| Element 1: | Causes and sources                 |
| Element 2: | Expected load reductions           |
| Element 3: | Management measures                |
| Element 4: | Technical and financial assistance |
| Element 5: | Information/education component    |
| Element 6: | Schedule                           |
| Element 7: | Measurable milestones              |
| Element 8: | Evaluation of progress             |
| Element 9: | Effectiveness monitoring           |

EPA funded a Nonpoint Source Education for Municipal Officials (NEMO) Project through the University of Arizona's Cooperative Extension Service. After experimenting with different ideas, University of Arizona and ADEQ agreed that this project would benefit Arizona most if the comprehensive characterization documents evolved into a watershed-based plans for the three target watersheds:

- & Bill Williams Watershed,
- & Verde Watershed, and
- & Upper Gila Watershed.

The goals of this project are:

- Characterize the watershed (soils, slope, population, geology, etc.).
- Identify areas that are susceptible to water quality problems and pollution (point and nonpoint sources). The plans will not only identify 303(d) listed or non-attaining waters, but also identify those waters/areas that are vulnerable to degradation.
- Identify the sources that need to be controlled to protect or improve water quality.
- Identify the problem areas ADEQ and/or stakeholders should address through monitoring or project implementation. Identify pristine areas (i.e. unique waters or special areas of concern) that need to be protected.
- Identify management measures to be implemented to protect or improve/restore water quality. Where and why? Estimate costs of the potential management measures.
- Estimate the load reductions expected from the different management measures. Rank the management measures to demonstrate which measures are the most effective means for protecting or restoring water quality.

These watershed-based plans will include many of the same elements of a TMDL implementation plan but are written for a much larger area. The University of Arizona will also include implementation recommendations that will assist ADEQ in focusing on potential problems and problem areas. Once the plans are complete, the University of Arizona Cooperative Extension Service will educate local land-use decision makers and other stakeholders.

This project will greatly increase the agency's knowledge of the watershed and help to more effectively fund water quality grant projects in Arizona. By characterizing and understanding the dynamics of each watershed, these watershed-based plans will also help ADEQ with their TMDL and monitoring

efforts. Watershed characterizations will help the monitoring programs improve site selection and identify priority-planning sites.

**TMDL Public Involvement and TMDL Implementation Plans** -- ADEQ tries to proactively involve and educate the stakeholders affected by the TMDL process. The goal is to involve these stakeholders while the TMDL is being written, so that citizens are aware of the problems up-front and can realize their role in helping remedy the identified problems through development of a TMDL implementation plan.

After the load and wasteload allocations are established in the TMDL, corrective actions or changes in practices must be implemented in the watershed so that these allocations will be met in the future. TMDL Implementation Plans (TIPs) provide a strategy that explains how the allocations in the TMDL and any reductions in existing pollutant loadings will be achieved and the time frame in which compliance with applicable surface water quality standards is expected to be achieved. These plans may include a phased process with interim targets for load reductions.

Based on EPA guidance, each implementation plan includes the following components:

- A description of the Best Management Practices, or other management measures, and associated costs that must be implemented to achieve the load reductions estimated in the plan (recognizing the natural variability and the difficulty in predicting the performance of the practices over time). An identification (using a map or a description) of the critical areas where those measures are needed.
- An action plan for implementing the management measures identified in the plan. This would include a schedule of interim, measurable milestones for determining whether the management measures or other control actions are being implemented effectively.
- A description of methods that will be used to evaluate the progress and effectiveness in achieving the plan goals.
- An information/education component that will be used to enhance public understanding of the project and encourage their early and continued participation in selecting, designing, and implementing BMPs.

- An estimate of the amounts of technical and financial assistance needed, associated costs, and/or the sources and authorities that will be relied upon, to implement the plan.

TMDL Implementation Plans use the information contained in the TMDL to develop a plan that encompasses the entire area causing known or potential pollution and contributing to the impairment. Scale varies depending on the causes and sources of contamination. Through active public involvement during the TMDL development, by the time the TMDL is completed, a TMDL Implementation Plan should also be written.

Development of these plans are to be community-led, when possible, and focus on encouraging volunteer groups to lead the way in implementing water quality improvement projects through the use of ADEQ's Water Quality Improvement Grant Program or other funding sources. The goal is to make sure that all of Arizona's waterbodies are clean and safe for uses such as swimming or fishing.



*TMDLs for arsenic, copper and zinc are near completion on this reach of Boulder Creek, near Bagdad, Arizona. The Hillside Mine tailings piles in the background are major contributing sources of metals in the stream. Implementation plans are in the planning stages.*



## How Can I Get Involved?

**Watershed Groups** -- The importance of working with interested participants at the watershed level cannot be overstated. It is important that all affected parties clearly understand the issues impacting water quality. Successful strategies to improve water quality need to be tailored to the social and hydrological reality within each watershed or drainage area.

Watersheds are geographic areas with natural boundaries that do not correspond with political boundaries. City, county, state, and federal jurisdictions can be a maze of legal and political perspectives, as well as different and diverse management goals to work through. For any comprehensive watershed approach to have long term success, it must involve private and public landowners, numerous political jurisdictions and coalitions of special interest groups. Through federal, state, and local partnerships, the goal of providing a cleaner, safer environment and ensuring its integrity for future generations can be achieved.

Successful watershed management strategies must rely on the cooperation of all stakeholders that live within the watershed or have management responsibilities for the lands and the waterbodies within. ADEQ relies on this type of cooperation, education, and partnership as the primary method to reduce nonpoint source pollution and improve the state's water quality. A list of active watershed partnerships in Arizona is provided in **Table 43** on the next page. These groups vary in their purpose and scope of concern, as some groups were established primarily for oversight for a specific TMDL, while others have more long-standing concerns about water quality and water quantity in their watershed.

By involving local communities, tribes, and private-sector organizations, Arizona is focusing and prioritizing restoration activities to achieve significant improvements in water resources, aquatic ecosystems and watershed health.

More information can be found at:

<http://www.azdeq.gov/comm/download/water>.

**Volunteer Monitoring** -- Across the nation, volunteer groups monitor the condition of streams, rivers, lakes, reservoirs, estuaries, coastal waters, wetlands, and wells. They do this because they want to help protect a stream, lake, or wetland near where they live, work, or play. Their efforts are of particular value in providing quality data and building stewardship of local waters.

Volunteers can make visual observations of habitat, land uses, and the impacts of storms, measure the physical and chemical characteristics of waters and assess

the abundance and diversity of living creatures, including aquatic insects, plants, fish, birds, and other wildlife. Volunteers can also clean up garbage-strewn waters and become involved in restoring degraded habitats. The number, variety, and complexity of these projects continues to increase.

During the next year, ADEQ will be devoting efforts to develop a Volunteer Monitoring Program. Volunteer groups across Arizona will be able to collect data to supplement the water quality information collected by ADEQ. The volunteer data can be used by ADEQ to: screen water for potential problems, further research or restoration efforts, establish baseline conditions or trends for waters that would otherwise go unmonitored, and help evaluate the success of Best Management Practices implemented to mitigate problems. Helping volunteer groups to collect credible and scientifically defensible water quality data is important since ADEQ, like many other organizations, must continue to do more with less resources in both personnel and funding.

Since 2003, ADEQ has been working closely with GateWay Community College in Phoenix, Arizona, to develop a modular water quality curriculum to train volunteers and others in proper sampling techniques, development of Sample and Analysis Plans and Quality Assurance Plans, and care and maintenance of equipment. The goal is to have a curriculum that can be tailored to the specific needs of the group while providing ADEQ with valuable water quality information.

ADEQ looks forward to working with volunteer monitoring groups. This coordination will also ensure, to the extent practical, that the groups collect data that meet Arizona's credible data requirements in the Impaired Water Identification Rule (Arizona Administrative Code R18-11-6) and can therefore be used to assess the status of water quality in Arizona's surface waters.

**Table 43. Arizona Watershed Partnerships**

Name of Partnership	Watershed Area	Primary Objectives	When and Where Meeting	Contact
<b>Bill Williams Watershed</b>				
Upper Bill Williams	The Upper Bill Williams watershed area is approximately defined by the Kirkland Creek watershed, a 405 square mile drainage, which is tributary to the Santa Maria River.	Mission is to manage and protect the water resource, water quality, and water rights. Advocates local control over our water resources and land use. Objectives are: - Ensure that surface and ground water resources are maintained at the current balance, to support irrigation, ranching, and domestic uses, as well as maintain excellent waterfowl and wildlife habitat. - Disseminate information so that citizens are well-informed of events and legislative activity that may impact them. - Cooperate with other rural watershed groups to influence favorable water legislation for rural areas.	3 <sup>rd</sup> Thursday of the month Skull Valley Community Center	Sondra Wilkening, secretary, (928) 925-6434 <a href="mailto:westwindsinc@yahoo.com">westwindsinc@yahoo.com</a> Troy Suter (928) 442-3885
<b>Colorado - Grand Canyon Watershed and Colorado - Lower Gila Watershed</b>				
Northwest Arizona Watershed Council	The area is defined by three groundwater basins: Hualapai Valley Basin and Sacramento Valley Basin in the Colorado - Grand Canyon, and the Big Sandy Basin in the Colorado - Lower Gila Watershed	Goal is to protect and preserve water and educate the public. The council recognizes the need for more information to adequately model supply and demand equations and relate these to general plans for development. Identifies and cleans up illegal dumping and other nonpoint source pollution.	Mohave County Public Library, 3269 N. Burbank, Kingman, Az. 4 pm 3 <sup>rd</sup> Wednesday of the month	Eino Roundy (928) 757-2818 Earl Engelhardt (928) 692-1068 <a href="mailto:imsprite@kingmanaz.net">imsprite@kingmanaz.net</a>
<b>Little Colorado - San Juan Watershed</b>				
Little Colorado River Multi Objective Management Group (LCR MOM)	This immense watershed covers nearly 27,000 square miles in northeast Arizona and northwest New Mexico.	The LCR MOM vision is to maintain and enhance the quality of life in this watershed through science and tradition based management of natural resources, in a way that ensures equity among shared interests, respects diverse cultural values, preserves environmental health of our land, while promoting appropriate economic growth and financial security of present and future generations.  The focus issues include: - Cultural resource preservation; - Economic development and recreation; - Education outreach; - Erosion and sediment control; - Flood loss reduction; - Water quality and quantity improvement; and - Watershed management enhancement.	Every other 3 <sup>rd</sup> Wednesday, for 2 days Holbrook or Winslow	Jim Boles (928) 289-2422 Dennis Chandler (928) 524-6063, Ext.5 <a href="mailto:dennis.chandler@az.usda.gov">dennis.chandler@az.usda.gov</a>
Show Low Creek	Show Low Creek drainage from Pinetop Springs and Thompson Springs to Fools Hollow Lake.	This grass roots group works to effect changes that will benefit the water quality and quantity. They are a member of the LCR MOM.	Meet on an as needed basis.	Tom Thomas (928) 368-8885 <a href="mailto:tthomas@ci.pinetop-lakeside.az.us">tthomas@ci.pinetop-lakeside.az.us</a>
Silver Creek Advisory Commission	The Silver Creek drainage area	They are a member of the LCR MOM.	2 <sup>nd</sup> Monday of the month Holbrook	Ron Solamon (928) 536-7366 Kerry Ballard (928) 536-2539 <a href="mailto:kballard@usa.net">kballard@usa.net</a>



Name of Partnership	Watershed Area	Primary Objectives	When and Where Meeting	Contact
Upper Little Colorado River Watershed Partnership	The Little Colorado River drainage above Lyman Lake	They are a member of the LCR MOM.	3 <sup>rd</sup> Thursday of the month. Springerville	Bill Greenwood (928) 333-4128 (x-226) <a href="mailto:bgreenwood@eagar.com">bgreenwood@eagar.com</a>
<b>Middle Gila Watershed</b>				
Tres Rios River Management Group  Federally sponsored by the US Army Corp of Engineers and locally sponsored by the City of Phoenix.	Watershed is the Salt River and Gila River drainage delineated by approximately Southern Ave (north) Baseline Ave (south), 83 <sup>rd</sup> Ave (east), and Agua Fria River (west).	The issues identified by this group include: - Stressors identified (inorganic and organic chemicals, pesticides, PBCs, and low dissolved oxygen); - Flood flows; - Agricultural storm water runoff; - Agricultural irrigation drainage and dewatering; - Concentrated animal feeding operation discharges; - Wastewater treatment plant discharges; - Landfill leachate; - Ground water inflow; - Sand and gravel area releases; and - Degradation of wildlife habitat.	Steering committee meets on the third Wednesday of the month.	Alice Brawley-Chesworth (City of Phoenix) (602) 262-1828 <a href="mailto:alice.brawleychesworth@phoenix.gov">alice.brawleychesworth@phoenix.gov</a>
Upper Agua Fria Watershed Partnership	Agua Fria River drainage area, excluding the Prescott AMA and the Phoenix AMA.	Water quality and water quantity issues identified by this group include: fast growth and development in the Prescott AMA; ranching/grazing issues; leaking underground storage tanks; illegal dumping along streams and in the National Monument; and water legal rights.	2 <sup>nd</sup> Tuesday of the month, meeting usually at Arcosanti	Mary Hoadley (928) 632-7135 <a href="mailto:earthhous@aol.com">earthhous@aol.com</a>
<b>Salt Watershed</b>				
Friends of Pinto Creek	Pinto Creek is a tributary to the Salt River and Roosevelt Lake.	Dedicated to the preservation of Pinto Creek, Powers Gulch, and Haunted Canyon.	Meet as needed	Tom Sonandres 623 583-6764 <a href="mailto:pintocreek@asu.edu">pintocreek@asu.edu</a>
Northern Gila County Water Planning Alliance (a.k.a. Mogollon Highlands)	Watershed is bounded by the Mogollon Rim to the north, Roosevelt Lake to the south, Sierra Ancha Mountains to the east, and Mazatzal Mountains to the west.	The Northern Gila County Water Plan Alliance formed to develop water strategies for the area around Payson, Pine and Strawberry along the Mogollon Rim. The area also is known as the Tonto Creek basin.	1 <sup>st</sup> Thursday of the month Star Valley	Ron Christensen, Chair (928) 474-2029 Lionel Martinez, Rim Trail Water Improvement District (928) 474-2029 Howard Matthews, Pine-Strawberry WID (928) 476-2142 Robert Mawson, Program Coordinator, (928) 473-2233 <a href="mailto:rmawson@cableone.net">rmawson@cableone.net</a>

Name of Partnership	Watershed Area	Primary Objectives	When and Where Meeting	Contact
<b>San Pedro - Willcox Playa - Rio Yaqui</b>				
Campomoch-Sacaton Watershed Group	Watershed is a 42,000 acre sub-watershed of the Willcox Playa including: Gillman Canyon, Apache Canyon, Reservoir Canyon, Sacaton Wash, an unnamed drainage (referred to as Big Draw) and Campomoch Draw. This area falls almost entirely within the ranch boundaries of Hook Open A Ranch and Redtail Ranch.	The group's primary objective is to implement conservation practices that will improve watershed health, improve water quality, and reduce downstream flood damages. Practices are specifically aimed at reducing soil erosion and water runoff, increasing ground cover, and improving wildlife habitat to reduce negative economic impacts.	Quarterly meetings at Willcox	Donna Matthews (520) 384-2229, ext 122 <a href="mailto:donna.matthews@az.usda.gov">donna.matthews@az.usda.gov</a> Dan Skinner at <a href="mailto:ds Skinner@goldtechind.com">ds Skinner@goldtechind.com</a>
Upper San Pedro Partnership	1,875 square mile basin from the Mexico border north to "the Narrows." The Huachuca, Mustang, Whetstone, and Rincon Mountains form the basin's western boundary and the Mule, Dagoon, Little Dagoon, and Winchester Mountains form the eastern boundary.	Purpose of the partnership is to coordinate and cooperate in the identification, prioritization and implementation of comprehensive policies and projects to assist in meeting water needs in the Sierra Vista Sub-watershed of the Upper San Pedro River Basin.	2 <sup>nd</sup> Wednesday of the month Sierra Vista	George Michael, Coordinating manager (520) 378-4048 <a href="mailto:gmichael2@mindspring.com">gmichael2@mindspring.com</a> Bob Strain, Chairman Advisory Council 520 459-4763
Middle - Lower San Pedro Partnership	San Pedro River drainage area, between the Narrows near Charleston, Arizona, and its confluence with the Gila River at Winkelman, Arizona.	This grass roots group works to effect changes that will benefit the water quantity and quality.	Meetings as needed	Resource Conservation and Development Agency: Sharon Reid (520) 586-3347 <a href="mailto:spvnrcd@theriver.com">spvnrcd@theriver.com</a>
<b>Santa Cruz - Rio Magdalena - Rio Sonoyta Watershed</b>				
Friends of the Santa Cruz River	Watershed includes the entire Santa Cruz River; however, the group generally focuses on the stretch from the international border to the Santa Cruz County - Pima County boundary.	Major issues of concern being addressed by this group include: - Maintaining existing flow, ground water pumping, and population growth demands; - Flood control and land uses; - Impacts on water quality of land uses, off road vehicles, public access, illegal dumping; - Monitoring water quality; - Understanding economics and resource management; - Maintaining wilderness experience, cultural and historic uses, river oases, habitat improvements, control of exotic species, and protection of endangered species; and - Weaknesses in international planning and cooperation.	3 <sup>rd</sup> Thursday of the month Tubac	Ben Lomell, President (520) 281-4904
Pima Association of Governments (PAG) Watershed Planning Subcommittee	Santa Cruz River watershed, focusing on the portion within Pima County.	The subcommittee provides a forum for exchanging information among stakeholders, conducting technical review of proposals and plans, and advising decision makers on matters affecting the Santa Cruz River watershed. The subcommittee coordinates with PAG's Stormwater Management Working Group and reports to PAG's broader Environmental Planning Advisory Committee.	Quarterly meetings and Thursday of first month of quarter 177 N. Church, Tucson	<a href="http://www.pagnet.org/WQ/particip.htm">http://www.pagnet.org/WQ/particip.htm</a> e-mail: <a href="mailto:wq@pagnet.org">wq@pagnet.org</a>



Name of Partnership	Watershed Area	Primary Objectives	When and Where Meeting	Contact
<b>Upper Gila Watershed</b>				
Gila Watershed Partnership	Gila River Watershed is about 6,000 square miles, extending from the New Mexico border to the Coolidge Dam (San Carlos Reservoir).	Objectives: - Conserve natural resources and enhance the environment, while maintaining or improving the economy; - Increase water quality and improve water quantity; - Increase recreational opportunities; and - Collaborate among partners and neighbors in New Mexico and the San Carlos Apache Tribe within the watershed.	2 <sup>nd</sup> Tuesday of the month in Graham County General Services building in Safford.	Jan Holder (928) 348-4577 <a href="mailto:watershedholder@yahoo.com">watershedholder@yahoo.com</a>
Eagle Creek	Eagle Creek is a sub-watershed within the Upper Gila Watershed.		As needed on Saturdays	Chase Caldwell, (480) 635-1245
<b>Verde Watershed</b>				
North Central Arizona Regional Watershed Consortium (NCARWC)	Verde River Watershed, largely defined by Yavapai County boundaries.	Formed to accomplish cooperative regional water management and reduce argument over water rights. Believes that a unified and knowledgeable voter base in rural Arizona may be able to effect the needed changes in Arizona water laws and statutes.	Meeting times and places vary. Contact president (currently Barbara Litrell).	Barbara Litrell, President (928) 649-0135 <a href="mailto:blitrell@aol.com">blitrell@aol.com</a> Bill Goss <a href="mailto:bill@billgoss.net">bill@billgoss.net</a> Anita Rochelle <a href="mailto:anitar772002@yahoo.com">anitar772002@yahoo.com</a>
Northern Gila County Water Plan Alliance (See the Salt Watershed)				
Oak Creek Canyon Task Force	Oak Creek is a sub-watershed of the Verde River.	Task Force goals: - Conserve natural resources and enhance the environment for wildlife and human uses; - Sustain and improve recreational opportunities; - Improve water quantity and quality; - Reduce damage due to storms, floods, human activities, or natural disasters; and - Engage public and governmental involvement through outreach and education.	2 <sup>nd</sup> Thursday of the month Sedona	Barry Allen (623) 551-8804 <a href="mailto:nelsonallen@earthlink.net">nelsonallen@earthlink.net</a> Morgan Stine <a href="mailto:morgan@direcway.com">morgan@direcway.com</a>
Stoneman Lake Property Owners Association	This closed basin (no outflow from the lake) is a 900 acre lake drainage area, located 40 miles south of Flagstaff.	Mission is to preserve the pristine environment that is Stoneman lake and to foster harmony and cooperation among neighbors to maintain the peace and tranquility so highly valued in the community.	Meeting times and places may vary.	Chris Estes, President (480) 585-5772 <a href="mailto:cklestes@msn.com">cklestes@msn.com</a> Bill McPeters, V. Pres (602) 431-1513 <a href="mailto:wedigit@juno.com">wedigit@juno.com</a>
Verde Watershed Association	Verde Watershed	Goals: - Conserve natural resources and enhance the environment; - Sustain, improve, and diversify recreational opportunities; - Improve water quality and quantity; - Sustain, enhance, and improve the environment for wildlife; - Reduce damage from storms, floods, and human-made activities and/or natural disasters; and - Engage public and governmental involvement through public outreach and education.	3 <sup>rd</sup> Tuesday of the month Prescott, Cottonwood, Camp Verde (varies)	Robert Hardy (928) 634-5526

(Watershed information obtained from Arizona Dept. of Water Resources 2004)

## What Funds are Available to Improve Water Quality?

Numerous funding sources can be used for projects that improve water quality in Arizona. Three of those funds are detailed below.

**Water Quality Improvement Grants** -- ADEQ distributes grant funds under Section 319(h) of the federal Clean Water Act to both public and private entities within Arizona. These grants are to implement on-the-ground water quality improvement projects that address nonpoint sources of pollution.

Grant applications that contain activities identified in a watershed-based plan (or equivalent plan) are given priority over other projects.

For a grant application to be considered eligible for evaluation, the application must comply with the process described in the current *Water Quality Improvement Grant Program Manual*, and the project description must indicate how all of the following will be accomplished:

- Improve, protect or maintain water quality in a waterbody in Arizona by addressing a nonpoint source of pollution;
- Demonstrate acceptable water quality management principles, sound design, and appropriate procedures;
- Yield benefits to the state at a level commensurate with project costs;
- Have an on-the-ground implementation component within Arizona;
- Provide for at least 40% of the project costs as non-federal match;
- Support the ADEQ, Water Quality Division Mission; and
- Be eligible under applicable state and federal regulations.

The Water Quality Improvement Grant Manual provides details about the grant program and includes the application forms. For more information about the Water Quality Improvement Grant Program or to be added to the mailing list, please contact Jean Ann Rodine, grant coordinator, at (602) 771-4635 or, toll-free in Arizona, (800) 234-5677, Ext. 771-4635, or email at:

[Rodine.Jean@azdeq.gov](mailto:Rodine.Jean@azdeq.gov). Additional information can also be found on the internet at <http://www.azdeq.gov/environ/water/mgmt/planning>.

**Water Protection Funds** -- In 1994, the Arizona Water Protection Fund was established to implement projects that would maintain, enhance, and restore rivers, streams, and associated riparian resources, including fish and wildlife that are dependent on these habitats. In previous years, the legislature has provided \$5,000,000 annually in grants to fund proactive incentives to implement water quality and water quantity restoration actions. However, in 2003, funding was

Water Quality Improvement Programs

limited to \$2,000,000 due to deficits in the state budget.

Any individual, entity, state or federal agency, or political subdivision of Arizona may submit an application to the Arizona Water Protection Fund Commission. For further information, please contact the commission at (602) 417-2400 extension 7016.

**Clean Water and Drinking Water Revolving Funds** -- The Water Infrastructure Finance Authority of Arizona (WIFA) is an independent agency of the state. It is authorized to finance the construction, rehabilitation and/or improvement of drinking water, wastewater, wastewater reclamation, or other water quality facilities/projects. Generally, WIFA offers borrowers below market interest on loans for 100% of eligible project costs from the following funds:

- Clean Water Revolving Fund (CWRF) for eligible publicly-held wastewater facilities,
- Drinking Water Revolving Fund (DWRF) for eligible publicly- and privately-held drinking water systems; and,
- Technical Assistance Program (TAP) Pre-design and design grants and loans for eligible wastewater and drinking water systems.

WIFA also manages a Technical Assistance Program. The program offers pre-design and design grants to eligible wastewater and drinking water systems under 10,001 population. Pre-design and design loans are available to all eligible systems. The purpose of the Technical Assistance Program is to enhance project readiness to proceed with a WIFA project construction loan.

## Regional 208 Water Quality Management Planning

Areawide Waste Treatment Management Planning was authorized by the Clean Water Act Section 208 in 1972. It requires regional planning agencies to develop comprehensive water quality management plans. These plans require existing and proposed wastewater treatment facilities to meet the anticipated municipal and industrial waste treatment needs of an area over a 20-year period, as well as provide general planning guidance for nonpoint source, sludge, storm water and other activities. The plans assure attainment of the state's water quality standards.



Currently, the Designated Planning Agencies are: Maricopa Association of Governments (MAG), Pima Association of Governments (PAG), Northern Arizona Council of Governments (NACOG), Central Arizona Association of Governments (CAAG), Southeastern Arizona Governments Organization (SEAGO), and La Paz, Mohave and Yuma Counties.

The Watershed Management Unit's 208 Program is responsible for three main tasks:

- Conducting 208 Consistency Reviews that assure that the proposed facility or usage will be consistent with the existing Certified Regional Water Quality Management Plan,
- Coordinating water quality management plan amendment approvals, and
- Providing technical support and outreach to regional planning agencies in developing comprehensive Water Quality Management Plans.

This outreach includes participation in the Water Quality Management Working Group bi-monthly meetings. The working group consists of the eight Designated Planning Areas and various state, federal or local entities involved in regulatory water quality planning. They meet bi-monthly to review plan amendments and make recommendations to ADEQ on regulated water quality management issues.

ADEQ continues to work with the Designated Planning Areas on incorporating a watershed-based approach to the 208 process. These watershed-based discussions also encourage the Designated Planning Areas to begin focusing more efforts on the nonpoint source side of the program; however, this is a slow process, as water pollution problems often span more than one political jurisdiction.

## Putting it all together

The programs described in this chapter function together to improve the quality of Arizona's water resources. The box below illustrates the water quality improvement process and the parties involved using a demonstration stream. Through this process, ADEQ strives to preserve, protect, and enhance water resources in Arizona by generating credible monitoring data, applying comprehensive assessment methods, developing plans for water quality improvement, and encouraging public involvement in water quality projects and planning.

### Example Stream - John Doe Creek

- |                 |  |
|-----------------|--|
| <b>Step #1</b>  | <b>Surface Water Monitoring and Standards Program</b><br>Establishes water quality standards for John Doe Creek.   |
| <b>Step #2</b>  | Field personnel obtain water quality data that is used to assess the biological, chemical, and physical integrity of the stream.   |
| <b>Step #3</b>  | <b>Volunteer Monitoring Program</b><br>Works with volunteer groups across Arizona to collect data. These data supplement water quality data and information collected by ADEQ and other agencies on John Doe Creek.  |
| <b>Step #4</b>  | <b>Watershed Management Unit</b><br>Completes state water quality assessment (305b Report) and John Doe Creek is identified as impaired and placed on the 303(d) List of impaired waters for copper and zinc.  |
| <b>Step #5</b>  | <b>TMDL Unit</b><br>Completes a TMDL study for copper and zinc on John Doe Creek.  |
| <b>Step #6</b>  | <b>Watershed Management Unit</b><br>Develops a TMDL implementation plan to improve water quality in the creek and identifies an action plan with milestones to be implemented by the stakeholders.   |
| <b>Step #7</b>  | <b>Grants and Outreach Unit</b><br>The stakeholders within the John Doe Creek watershed apply for a Water Quality Improvement Grant and receive priority because there is a TMDL implementation plan in place.   |
| <b>Step #8</b>  | The project(s) is approved and the Grants and Outreach Unit is responsible for managing the project.   |
| <b>Step #9</b>  | <b>Volunteer Monitoring Program</b><br>Works with project managers or other volunteer groups to collect data. These data help to determine the effectiveness of the management measures that are implemented, as identified in the TMDL implementation plan. |
| <b>Step #10</b> | <b>Grants and Outreach Unit</b><br>The water quality improvement project is completed and the project is closed out.   |
| <b>Step #11</b> | <b>TMDL Unit</b><br>The targeted monitoring staff of the TMDL Unit conduct follow-up water quality monitoring. The data indicate that John Doe Creek is meeting water quality standards and the stream is added to the list of "attaining" waters.           |

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## Appendix A. Acronyms, Abbreviations, Definitions, and Units of Measure

<b>AAC</b>	Arizona Administrative Code
<b>ADEQ</b>	Arizona Department of Environmental Quality
<b>AGFD</b>	Arizona Game and Fish Department
<b>Agricultural Irrigation (Agl)</b>	Surface water is used for the irrigation of crops.
<b>Agricultural Livestock Watering (AgL)</b>	Surface water is used as a supply of water for consumption by livestock.
<b>Active Management Area (AMA)</b>	A ground water <u>quantity</u> management area, established under the Groundwater Management Code, established where ground water overdraft is most severe. There are five AMA's: Phoenix, Pinal, Prescott, Santa Cruz, and Tucson.
<b>Aquatic and Wildlife Coldwater Fishery (A&amp;Wc)</b>	Surface water used by animals, plants, or other organisms (including salmonid fish) for habitation, growth, or propagation, generally occurring above 5000 feet elevation.
<b>Aquatic and Wildlife Effluent Dependent Water (A&amp;Wedw)</b>	Surface water that consists of discharges of treated wastewater that is classified as an effluent-dependent water by ADEQ under R18-11-113 of the Arizona Administrative Code. An effluent-dependent water, without the discharge of treated wastewater, would be an ephemeral water. This surface water is used by animals, plants, or other organisms for habitation, growth, or propagation.
<b>Aquatic and Wildlife Ephemeral (A&amp;We)</b>	Surface water that has a channel that is at all times above the water table, and that flows only in direct response to precipitation. Ephemeral water is used by animals, plants, or other organisms (excluding fish) for habitation, growth, or propagation.
<b>Aquatic and Wildlife Warmwater Fishery (A&amp;Ww)</b>	Surface water used by animals, plants, or other organisms (excluding salmonid fish) for habitation, growth, or propagation, generally occurring at elevations less than 5000 feet.
<b>Aquatic Biotic Tissue</b>	Fish tissue or other aquatic organism tissue; criteria are from US Fish and Wildlife Service published action levels.
<b>BEHI</b>	Bank erosion hazard index.
<b>Biological Communities</b>	Groups of fish, macroinvertebrates, algae, or riparian vegetation occupying a habitat or area.
<b>BLM</b>	United States Bureau of Land Management
<b>BoR</b>	United States Bureau of Reclamation
<b>CAP</b>	The Central Arizona Project is a canal system that brings Colorado River water across Arizona, terminating in Tucson.
<b>CERCLA</b>	Comprehensive Environmental Response Compensation and Liability Act. EPA's Superfund Program.
<b>Core Parametric Coverage</b>	Although all parameters with numeric standards are used for assessments, there needs to be at least three sampling events with these specified parameters to assess a designated use as "attaining." This specified parametric coverage does <u>not</u> need to be available to assess a designated use as "impaired."
<b>Credible Data</b>	Surface water monitoring data that is collected meeting requirements established in the Impaired Water Identification Rule (R18-11-602). These requirements include collecting and analyzing data using a Quality Assurance Plan, Sampling and Analysis Plan, approved methods, approved laboratory, and adequately trained personnel.

<b>Designated Uses</b>	<p>Designated uses are specified for stream segments and lakes in the surface water rules (Arizona Administrative Code R18-11-104). Waterbodies not listed in the rules obtain their designated uses through the "Tributary Rule". Arizona's surface water designated uses include:</p> <p><b>Aquatic and Wildlife</b>  Coldwater Fishery (A&amp;Wc)  Warmwater Fishery (A&amp;Ww)  Ephemeral Stream (A&amp;We)  Effluent Dependent Water (A&amp;Wedw),  <b>Domestic Water Source (DWS),</b>  <b>Fish Consumption (FC),</b>  <b>Full Body Contact (FBC)</b> (i.e., swimming),  <b>Partial Body Contact (PBC)</b> (i.e., non-swimming recreation),  <b>Agricultural Irrigation (Agl),</b> and  <b>Agricultural Livestock Watering (Agl).</b></p>
<b>Designated Use Support</b>	<p><b>Attaining</b> – Surface water quality standards are being met based on a minimum of 3 monitoring events that provide seasonal representation and core parametric coverage.</p> <p><b>Threatened</b> – Surface water quality standards are currently being met, but a trend analysis indicates that the surface water is likely to be impaired before the next assessment.</p> <p><b>Impaired</b> – Surface water quality standards are not being met based on sufficient number of samples to meet the test of impairment identified in the Impaired Waters Identification Rule (<b>Appendix B</b>).</p> <p><b>Not attaining</b> – Surface water is not attaining its uses, but a TMDL does not need to be completed because:</p> <ol style="list-style-type: none"> <li>1) A TMDL has been approved but the surface water is not yet achieving its designated uses,</li> <li>2) Another action is occurring that so that the surface water is expected to attain its uses before the next assessment,</li> <li>3) The impairment is due to pollution where a pollutant loading cannot be calculated (e.g., hydromodification),</li> </ol> <p><b>Inconclusive</b> – Monitoring or other assessment information available is insufficient to assess the surface water as "attaining," "threatened," "impaired," or "not attaining."</p> <p><b>Not assessed</b> – Only one or two water sample or no samples. No information indicating that a narrative standard is being violated.</p>
<b>Domestic Water Source (DWS)</b>	Surface water is used as a potable water supply. Coagulation, sedimentation, filtration, disinfection or other treatments may be necessary to yield a finished water suitable for human consumption.
<b>Effluent Dependent Water</b>	(See Aquatic and Wildlife Effluent Dependent Water)
<b>EMAP</b>	US Environmental Protection Agency's Environmental Monitoring and Assessment Project.
<b>EPA or USEPA</b>	The United States Environmental Protection Agency
<b>Ephemeral Flow</b>	(See Aquatic and Wildlife Ephemeral Water)
<b>Exceed/Exceedance</b>	Monitoring data results were greater than a maximum standard or below a minimum standard.
<b>Fish Consumption (FC)</b>	Surface water is used by humans for harvesting aquatic organisms for consumption. Harvestable aquatic organisms include, but are not limited to, fish, clams, crayfish, and frogs.
<b>Full Body Contact (FBC)</b>	Surface water use causes the human body to come into direct contact with the water to the point of complete submergence (e.g., swimming). The use is such that ingestion of the water is likely to occur and certain sensitive body organs (e.g., eyes, ears, or nose) may be exposed to direct contact with the water.
<b>IBWC</b>	International Boundary and Water Commission, an international commission established to resolve water quality issues along the United States border with Mexico.
<b>Intermittent Flow</b>	Surface water flows continuously only at certain times of the year, as when it receives water from springs or from some surface source such as melting snow (i.e., seasonal).
<b>Macroinvertebrates</b>	Stream bottom dwelling insects and other organisms that inhabit freshwater habitats for at least part of their life cycle and are retained by a mesh screen size greater than 0.2 millimeters.



<b>MCL</b>	Maximum Contaminant Level. Standards for public drinking water systems. (See also SMCL.)
<b>Narrative Water Quality Standards</b>	(R18-11-108) Surface waters will be free from pollutants in amounts or combinations that: <ul style="list-style-type: none"> <li>- Settle to form bottom deposits that impair aquatic life or recreational uses;</li> <li>- Cause an objectionable odor;</li> <li>- Cause an off-taste or odor in drinking water;</li> <li>- Cause an off-flavor in aquatic organisms or waterfowl;</li> <li>- Are "toxic" to humans, animals, plants, or other organisms;</li> <li>- Cause the growth of algae or aquatic plants that impair aquatic life or recreational uses;</li> <li>- Cause or contribute to a violation of an aquifer water quality standard (R18-11-405 through 406); or</li> <li>- Change the color of the surface water from natural background levels.</li> </ul>
<b>Naturally Occurring Condition</b>	The condition of a surface water or segment that would have occurred in the absence of pollutant loadings as a result of human activity.
<b>NAWQA</b>	The US Geological Survey's National Water Quality Assessment Program.
<b>Nonpoint Source</b>	These sources of pollutants come from nondiscrete discharges such as atmospheric deposition, contaminated sediment, and land uses that generate polluted runoff like agriculture, urban land development, forestry, construction, and on-site sewage disposal systems. Nonpoint source pollution also encompasses activities that either change the natural flow regime of a stream or wetland or result in habitat disturbance.
<b>NPDES / AZPDES</b>	National Pollutant Discharge Elimination System is a federal point source discharge permit. ADEQ has obtained primacy for this program, which uses the acronym AZPDES in describing this permit.
<b>Partial Body Contact (PBC)</b>	Surface water is used so that the human body comes into direct contact with the water, but normally not at the point of complete submergence (i.e., non-swimming recreation). The use is such that ingestion of the water is not likely to occur, nor will sensitive body organs (e.g., eyes, ears, or nose) normally be exposed to direct contact with the water.
<b>Perennial Flow</b>	Surface water that flows continuously.
<b>Point Source</b>	These sources of pollution are discrete, identifiable sources such as pipes or ditches that are primarily associated with industries and municipal sewage treatment plants. (See nonpoint source.)
<b>Public Water Supply</b>	A water system which conveys water for human consumption to 15 or more service connections or serves an average of at least 25 persons per day (as defined by the federal Safe Drinking Water Act).
<b>QAP</b>	Quality Assurance Plan. This is a written plan detailing how environmental data will be collected, analyzed, assessed for quality, and establishes the data quality objectives that the data must meet.
<b>RCRA</b>	Resource Conservation and Recovery Act established by the federal government to control hazardous wastes.
<b>Reach</b>	A segment of a stream. EPA originally divided Arizona's streams on the USGS hydrology at 1:100,000 scale map into reaches based on hydrological features such as tributaries. ADEQ has further subdivided these reaches based on changes in designated use support and water quality.
<b>Sampling Event</b>	A "sampling event" is one or more samples taken under consistent conditions on one or more consecutive days at a specific location.
<b>SAP</b>	Sampling and Analysis Plan. This is a written site-specific plan to ensure that samples collected and analyzed meet data quality objectives and are representative of surface water conditions at the time of sampling.
<b>SMCL</b>	Secondary Maximum Contaminant Level. A guidance level established by EPA for substances that create only taste or odor problems in drinking water.
<b>SRP</b>	Salt River Project

<b>Surface Water</b>	<p>These are "waters of the United States", which include:</p> <ul style="list-style-type: none"> <li>- All waters which are, have been, or could be used for interstate or foreign commerce;</li> <li>- All interstate waters or wetlands;</li> <li>- All lakes, reservoirs, natural ponds, rivers, streams (including intermittent and ephemeral streams), creeks, washes, draws, mudflats, sandflats, wetlands, backwaters, playas (etc.) which could be used by visitors to our state for recreation, from which fish or shellfish could be taken or sold, or which is used for industrial purposes; or</li> <li>- All impoundments, wetlands, or tributaries of above waters.</li> </ul> <p>(Summarized from Arizona Administrative Code R18-11-101)</p>
<b>SVOC</b>	Semi-volatile organic chemical or compound (see also VOC)
<b>Toxic Chemicals</b>	Pollutants or combinations of pollutants which, after discharge and exposure (contact, ingestion, inhalation, or assimilation) to any organism (either directly from the environment or indirectly through the food chain), may cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunctions in reproduction), or physical deformations in such organisms or offspring.
<b>TMDL</b>	Total Maximum Daily Load. A TMDL is a written, quantitative plan and analysis to determine the maximum loading on a pollutant basis that a surface water can assimilate and still attain and maintain a specific water quality standard during all conditions. The TMDL allocates the loading capacity of the surface water to point sources and nonpoint sources identified in the watershed, accounting for natural background levels and seasonal variation, with an allocation set aside as a margin of safety.
<b>Tributary Rule</b>	<p>This rule (Arizona Administrative Code R18-11-105, amended in 2002) is used to determine "Designated Uses" for waterbodies not specifically listed in the surface water protection rules. Uses are assigned as follows:</p> <ul style="list-style-type: none"> <li>- Ephemeral waters are assigned the Aquatic and Wildlife ephemeral and Partial Body Contact uses only.</li> <li>- Perennial and intermittent waters are assigned the Aquatic and Wildlife coldwater use if above 5,000 feet, and warmwater if below 5,000 feet. The Fish Consumption and Full Body Contact uses are assigned to all perennial and intermittent waters.</li> <li>- Agricultural and Domestic Water Source uses do not apply to any waters not listed in rule.</li> </ul>
<b>Trophic Status</b>	<p>Lakes can be classified by the level of nutrients available for primary biological production. Lakes generally progress through the following trophic phases or states:</p> <p><b>Oligotrophic</b> -- Low algal or plant productivity;</p> <p><b>Mesotrophic</b> -- Medium algal or plant productivity;</p> <p><b>Eutrophic</b> -- High algal or plant productivity; and productivity;</p> <p><b>Hypereutrophic</b> -- Very high algal or plant productivity and light limited. That is, instead of growth being limited by nutrient availability (as it is in other trophic conditions), growth becomes limited by light.</p>
<b>Unique Water</b>	A surface water classified as an outstanding state resource water under Arizona Administrative Code R18-11-112.
<b>USFWS</b>	United States Fish and Wildlife Service
<b>USFS</b>	United States Forest Service
<b>USGS</b>	United States Geological Survey
<b>UST</b>	Underground Storage Tanks Program for eliminating the release of toxic chemicals from storage tanks.
<b>VOC</b>	Volatile organic chemical or compound (e.g., solvents)
<b>Waters of the United States</b>	(See "surface water" definition.)
<b>WTP</b>	Water Treatment Plant for drinking water treatment.
<b>WWTP</b>	Wastewater Treatment Plant
<b>WQARF</b>	Water Quality Assurance Revolving Fund. Arizona's Superfund program for cleanup of contaminated sites.



## CHEMICAL ABBREVIATIONS

BTEX	combination of petroleum hydrocarbons including: benzene, toluene, ethylbenzene, xylene
DCA	dichloroethane
DCB	dichlorobenzene
DCE	dichloroethene
MTBE	methyl tertiary butyl ether
PCE	tetrachloroethane
TCE	trichloroethene

## UNITS OF MEASUREMENT AND CONVERSIONS

MEASUREMENT USE	UNIT	EQUIVALENT UNITS OR CONVERSION
Bacteria concentration in water	colony forming units (CFU) per 100 milliliter	
Chemical concentrations in water	milligram per liter (mg/L) microgram per liter ( $\mu$ g/L)	1 mg/L = 0.001 grams per liter 1 mg/L = parts per million (ppm) 1 $\mu$ g/L = 0.001 milligram per liter (mg/l) 1 $\mu$ g/L = 0.000001 grams per liter 1 $\mu$ g/L = 1 parts per billion (ppb)
Chemical concentrations in animal tissue and sediment	milligram per kilogram (mg/kg) microgram per kilogram ( $\mu$ g/kg)	1 mg/kg = 1 parts per million (ppm) 1 mg/kg = 1 microgram per gram ( $\mu$ g/g) 1 $\mu$ g/kg = 1 parts per billion (ppb)
Ground water quantity	acre-feet	1 acre-foot = 325,900 gallons
pH in water	standard unit (SU)	
Radiochemical concentrations in water	picocuries per liter (pCi/L)	
Rate of flow	cubic feet per second (cfs)	1 cfs = 448.83 gallons per minute (gpm) 1 cfs = 646,000 gallons per day (gpd)
Lake area	acres	
Stream length	miles	1 mile = 1.6 kilometers (km)
Watershed size	square miles	1 square mile = 640 acres per square mile
Water turbidity (ability of light to travel through the water)	Nephelometric Turbidity Unit (NTU)	



## Appendix B. Arizona's Statute and Rules for Impaired Waters

### ARIZONA'S REVISED STATUTES ARTICLE 2.1 TOTAL MAXIMUM DAILY LOADS 49-231 TO 49-238 (effective July 2000)

#### 49-231. Definitions

In this article, unless the context otherwise requires:

1. "Impaired water" means a navigable water for which credible scientific data exists that satisfies the requirements of section 49-232 and that demonstrates that the water should be identified pursuant to 33 United States Code section 1313(d) and the regulations implementing that statute.
2. "Surface water quality standard" means a standard adopted for a navigable water pursuant to sections 49-221 and 49-222 and section 303(c) of the clean water act (33 United States Code section 1313(c)).
3. "TMDL implementation plan" means a written strategy to implement a total maximum daily load that is developed for an impaired water. TMDL implementation plans may rely on any combination of the following components that the department determines will result in achieving and maintaining compliance with applicable surface water quality standards in the most cost-effective and equitable manner:
  - (a) Permit limitations.
  - (b) Best management practices.
  - (c) Education and outreach efforts.
  - (d) Technical assistance.
  - (e) Cooperative agreements, voluntary measures and incentive-based programs.
  - (f) Load reductions resulting from other legally required programs or activities.
  - (g) Land management programs.
  - (h) Pollution prevention planning, waste minimization or pollutant trading agreements.
  - (i) Other measures deemed appropriate by the department.
4. "Total maximum daily load" means an estimation of the total amount of a pollutant from all sources that may be added to a water while still allowing the water to achieve and maintain applicable surface water quality standards. Each total maximum daily load shall include allocations for sources that contribute the pollutant to the water, as required by section 303(d) of the clean water act (33 United States Code section 1313(d)) and regulations implementing that statute to achieve applicable surface water quality standards.

#### 49-232. Lists of impaired waters; data requirements; rules

A. At least once every five years, the department shall prepare a list of impaired waters for the purpose of complying with section 303(d) of the clean water act (33 United States Code section 1313(d)). The department shall provide public notice and allow for comment on a draft list of impaired waters prior to its submission to the united states environmental protection agency. The department shall prepare written responses to comments received on the draft list. The department shall publish the list of impaired waters that it plans to submit initially to the regional administrator and a summary of the responses to comments on the draft list in the Arizona administrative register at least forty-five days before submission of the list to the regional administrator. Publication of the list in the Arizona administrative register is an appealable agency action pursuant to title 41, chapter 6, article 10 that may be appealed by any party that submitted written comments on the draft list. If the department receives a notice of appeal of a listing pursuant to section 41-1092, subsection B within forty-five days of the publication of the list in the Arizona administrative register, the department shall not include the challenged listing in its initial submission to the regional administrator. The department may subsequently submit the challenged listing to the regional administrator if the listing is upheld in the director's final administrative decision pursuant to section 41-1092.08, or if the challenge to the listing is withdrawn prior to a final administrative decision.

B. In determining whether a water is impaired, the department shall consider only reasonably current credible and scientifically defensible data that the department has collected or has received from another source. Results of water sampling or other assessments of water quality, including physical or biological health, shall be considered credible and scientifically defensible data only if the department has determined all of the following:

1. Appropriate quality assurance and quality control procedures were followed and documented in collecting and analyzing the data.
2. The samples or analyses are representative of water quality conditions at the time the data was collected.
3. The data consists of an adequate number of samples based on the nature of the water in question and the parameters being analyzed.
4. The method of sampling and analysis, including analytical, statistical and modeling methods, is generally accepted and validated in the scientific community as appropriate for use in assessing the condition of the water.

C. The department shall adopt by rule the methodology to be used in identifying waters as impaired. The rules shall specify all of the following:

1. Minimum data requirements and quality assurance and quality control requirements that are consistent with subsection B of this section and that must be satisfied in order for the data to serve as the basis for listing and delisting decisions.
2. Appropriate sampling, analytical and scientific techniques that may be used in assessing whether a water is impaired.
3. Any statistical or modeling techniques that the department uses to assess or interpret data.
4. Criteria for including and removing waters from the list of impaired waters, including any implementation procedures developed pursuant to subsection F of this section. The criteria for removing a water from the list of impaired waters shall not be any more stringent than the criteria for adding a water to that list.

D. In assessing whether a water is impaired, the department shall consider the data available in light of the nature of the water in question, including whether the water is an ephemeral water. A water in which pollutant loadings from naturally occurring conditions alone are sufficient to cause a violation of applicable surface water quality standards shall not be listed as impaired.

E. If the department has adopted a numeric surface water quality standard for a pollutant and that standard is not being exceeded in a water, the department shall not list the water as impaired based on a conclusion that the pollutant causes a violation of a narrative or biological standard unless:

1. The department has determined that the numeric standard is insufficient to protect water quality.
2. The department has identified specific reasons that are appropriate for the water in question, that are based on generally accepted scientific principles and that support the department's determination.

F. Before listing a navigable water as impaired based on a violation of a narrative or biological surface water quality standard and after providing an opportunity for public notice and comment, the department shall adopt implementation procedures that specifically identify the objective basis for determining that a violation of the narrative or biological criterion exists. A total maximum daily load designed to achieve compliance with a narrative or biological surface water quality standard shall not be adopted until the implementation procedure for the narrative or biological surface water quality standard has been adopted.

G. On request, the department shall make available to the public data used to support the listing of a water as impaired and may charge a reasonable fee to persons requesting the data.

H. By January 1, 2002, the department shall review the list of waters identified as

impaired as of January 1, 2000 to determine whether the data that supports the listing of those waters complies with this section. If the data that supports a listing does not comply with this section, the listed water shall not be included on future lists submitted to the United States environmental protection agency pursuant to 33 United States Code section 1313(d) unless in the interim data that satisfies the requirements of this section has been collected or received by the department.

I. The department shall add a water to or remove a water from the list using the process described in section 49-232, subsection A outside of the normal listing cycle if it collects or receives credible and scientifically defensible data that satisfies the requirements of this section and that demonstrates that the current quality of the water is such that it should be removed from or added to the list. A listed water may no longer warrant classification as impaired or an unlisted water may be identified as impaired if the applicable surface water quality standards, implementation procedures or designated uses have changed or if there is a change in water quality.

#### **49-233. Priority ranking and schedule**

A. Each list developed by the department pursuant to section 49-232 shall contain a priority ranking of navigable waters identified as impaired and for which total maximum daily loads are required pursuant to section 49-234 and a schedule for the development of all required total maximum daily loads.

B. In the first list submitted to the United States environmental protection agency after the effective date of this article, the schedule shall be sufficient to ensure that all required total maximum daily loads will be developed within fifteen years of the date the list is approved by the environmental protection agency. Total maximum daily loads that are required to be developed for navigable waters that are included for the first time on subsequent lists shall be developed within fifteen years of the initial inclusion of the water on the list.

C. As part of the rule making prescribed by section 49-232, subsection C, the department shall identify the factors that it will use to prioritize navigable waters that require development of total maximum daily loads. At a minimum and to the extent relevant data is available, the department shall consider the following factors in prioritizing navigable waters for development of total maximum daily loads:

1. The designated uses of the navigable water.
2. The type and extent of risk from the impairment to human health or aquatic life.
3. The degree of public interest and support, or its lack.
4. The nature of the navigable water, including whether it is an ephemeral,



intermittent or effluent-dependent water.

5. The pollutants causing the impairment.
6. The severity, magnitude and duration of the violation of the applicable surface water quality standard.
7. The seasonal variation caused by natural events such as storms or weather patterns.
8. Existing treatment levels and management practices.
9. The availability of effective and economically feasible treatment techniques, management practices or other pollutant loading reduction measures.
10. The recreational and economic importance of the water.
11. The extent to which the impairment is caused by discharges or activities that have ceased.
12. The extent to which natural sources contribute to the impairment.
13. Whether the water is accorded special protection under federal or state water quality law.
14. Whether action that is taken or that is likely to be taken under other programs, including voluntary programs, is likely to make significant progress toward achieving applicable standards even if a total maximum daily load is not developed.
15. The time expected to be required to achieve compliance with applicable surface water quality standards.
16. The availability of documented, effective analytical tools for developing a total maximum daily load for the water with reasonable accuracy.
17. Department resources and programmatic needs.

**49-234. Total maximum daily loads; implementation plans**

A. The department shall develop total maximum daily loads for those navigable waters listed as impaired pursuant to this article and for which total maximum daily loads are required to be adopted pursuant to 33 United States Code section 1313(d) and the regulations implementing that statute. The department may estimate total maximum daily loads for navigable waters not listed as impaired pursuant to this article, for the purposes of developing information to satisfy the requirements of 33 United States Code section 1313(d)(3), only after it has developed total maximum daily loads for all navigable waters identified as impaired pursuant to this article or if necessary to support permitting of new point source discharges.

B. In developing total maximum daily loads, the department shall use only statistical and modeling techniques that are properly validated and broadly accepted by the scientific community. The modeling technique may vary based on the type of water and the quantity and quality of available data that meets the quality assurance and quality control requirements of section 49-232. The department may establish the statistical and modeling techniques in rules adopted

pursuant to section 49-232, subsection C.

C. Each total maximum daily load shall:

1. Be based on data and methodologies that comply with section 49-232.
2. Be established at a level that will achieve and maintain compliance with applicable surface water quality standards.
3. Include a reasonable margin of safety that takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. The margin of safety shall not be used as a substitute for adequate data when developing the total maximum daily load.
4. Account for seasonal variations that may include setting total maximum daily loads that apply on a seasonal basis.

D. For each impaired water, the department shall prepare a draft estimate of the total amount of each pollutant that causes the impairment from all sources and that may be added to the navigable water while still allowing the navigable water to achieve and maintain applicable surface water quality standards. The department shall provide public notice and allow for comment on each draft estimate and shall prepare written responses to comments received on the draft estimates. The department shall publish the determinations of total pollutant loadings that will not result in impairment that it intends to submit initially to the regional administrator, along with a summary of the responses to comments on the estimated loadings, in the Arizona administrative register at least forty-five days before submission of the loadings to the regional administrator. Publication of the loadings in the administrative register is an appealable agency action pursuant to title 41, chapter 6, article 10 that may be appealed by any party that submitted written comments on the estimated loadings. If the department receives a notice of appeal of a loading pursuant to section 41-1092, subsection B within forty-five days of the publication of the loading in the Arizona administrative register, the department shall not submit the challenged loading to the regional administrator until either the challenge to the loading is withdrawn or the director has made a final administrative decision pursuant to section 41-1092.08.

E. After each final loading pursuant to subsection D of this section is adopted and consistent with subsection F of this section, the department shall determine draft allocations among the contributing sources that are sufficient to achieve the total loading established pursuant to subsection D of this section. The department's proposed determination of allocations shall be subject to public notice and comment. The department shall prepare written responses to comments received on the draft allocations. After consideration of public comment received, the department shall publish the allocations and a summary of the responses to comments in the Arizona administrative register. The

publication shall occur at least forty-five days before submission of the allocations to the regional administrator, if such submission is required by the rules implementing 33 United States Code section 1313(d). Publication of the allocations in the Arizona administrative register is an appealable agency action pursuant to title 41, chapter 6, article 10 that may be appealed by any party that submitted written comments on the draft allocations. If the department receives a notice of appeal of an allocation pursuant to section 41-1092, subsection B within forty-five days of the publication of the allocation in the Arizona administrative register, the department shall not take further action on the challenged allocation, or submit it to the regional administrator if such submission is required by the rules implementing 33 United States Code section 1313(d), until either the challenge to the loading is withdrawn or the director has made a final administrative decision pursuant to section 41-1092.08.

F. The department shall make reasonable and equitable allocations among sources when developing total maximum daily loads. At a minimum, the department shall consider the following factors in making allocations:

1. The environmental, economic and technological feasibility of achieving the allocation.
2. The cost and benefit associated with achieving the allocation.
3. Any pollutant loading reductions that are reasonably expected to be achieved as a result of other legally required actions or voluntary measures.

G. For each total maximum daily load, the department shall establish a TMDL implementation plan that explains how the allocations and any reductions in existing pollutant loadings will be achieved. Any reductions in loadings from nonpoint sources shall be achieved voluntarily. The department shall provide for public notice and comment on each TMDL implementation plan. Any sampling or monitoring components of a TMDL implementation plan shall comply with section 49-232.

H. Each TMDL implementation plan shall provide the time frame in which compliance with applicable surface water quality standards is expected to be achieved. The plan may include a phased process with interim targets for load reductions. Longer time frames are appropriate in situations involving multiple dischargers, technical, legal or economic barriers to achieving necessary load reductions, scientific uncertainty regarding data quality or modeling, significant loading from natural sources or significant loading resulting from discharges or activities that have already ceased.

I. For navigable waters that are impaired due in part to historical factors that are difficult to address, including contaminated sediments, the department shall consider those historical factors in determining allocations for existing point

source discharges of the pollutant or pollutants that cause the impairment. In developing total maximum daily loads for those navigable waters, the department shall use a phased approach in which expected long-term loading reductions from the historical sources are considered in establishing short-term allocations for the point sources. While total maximum daily loads and TMDL implementation plans are being completed, any permits issued for the point sources are deemed consistent with this article if the permits require reasonable reductions in the discharges of the pollutants causing the impairment and are not required to include additional reductions if those reductions would not significantly contribute to attainment of surface water quality standards.

J. After a total maximum daily load and a TMDL implementation plan have been adopted for a navigable water, the department shall review the status of the navigable water at least once every five years to determine if compliance with applicable surface water quality standards has been achieved. If compliance with applicable surface water quality standards has not been achieved, the department shall evaluate whether modification of the total maximum daily load or TMDL implementation plan is required.

#### **49-235. Rules**

The department shall adopt any rules necessary to implement this article.

#### **49-236. Report**

By September 1, 2005, the department shall submit a report to the governor, the speaker of the house of representatives and the president of the senate detailing progress made under this program and shall provide a copy to the secretary of state and the department of library, archives and public records. At a minimum, the report shall:

1. Evaluate the effectiveness of the total maximum daily load program and identify any recommended statutory changes to make the program more efficient, effective and equitable.
2. Assess the extent to which water quality problems that cannot be effectively addressed under the total maximum daily load program may be addressed under other federal or state laws.
3. Identify the number of appeals of department decisions under this article sought pursuant to title 41, chapter 6, article 10 and the disposition of those appeals, and assess the impact of those appeals on the department's ability to administer the program effectively.

#### **49-237. Impact of successful judicial appeal of Arizona Department of Environmental Quality decision**

If a person appeals to court and succeeds in overturning or modifying a final administrative decision of the director pursuant to this article in an appeal



initiated pursuant to title 41, chapter 6, article 10, within thirty days of the court's decision the department shall take the steps necessary to implement the court's decision, unless the director's decision that is overturned or modified was submitted to and approved by the regional administrator, in which case within thirty days of the court's decision the department shall request that the regional administrator modify the approval to reflect the court's decision.

**49-238. Program termination**

The program established by this article ends on July 1, 2010 pursuant to section 41-3102.

**TITLE 18. ENVIRONMENTAL QUALITY  
CHAPTER 11. DEPARTMENT OF ENVIRONMENTAL QUALITY  
WATER QUALITY STANDARDS**

**ARTICLE 6. IMPAIRED WATER IDENTIFICATION**

**R18-11-601. Definitions**

In addition to the definitions established in A.R.S. §§ 49-201 and 49-231, and A.A.C. R18-11-101, the following terms apply to this Article:

1. "303(d) List" means the list of surface waters or segments required under section 303(d) of the Clean Water Act and A.R.S. Title 49, Chapter 2, Article 2.1, for which TMDLs are developed and submitted to EPA for approval.
2. "Attaining" means there is sufficient, credible, and scientifically defensible data to assess a surface water or segment and the surface water or segment does not meet the definition of impaired or not attaining.
3. "AZPDES" means the Arizona Pollutant Elimination Discharge System.
4. "Credible and scientifically defensible data" means data submitted, collected, or analyzed using:
  - a. Quality assurance and quality control procedures under A.A.C. R18-11-602;
  - b. Samples or analyses representative of water quality conditions at the time the data were collected;
  - c. Data consisting of an adequate number of samples based on the nature of the water in question and the parameters being analyzed; and
  - d. Methods of sampling and analysis, including analytical, statistical, and modeling methods that are generally accepted and validated by the scientific community as appropriate for use in assessing the condition of the water.
5. "Designated use" means those uses specified in 18 A.A.C. 11, Article 1 for each surface water or segment whether or not they are attaining.
6. "EPA" means the U.S. Environmental Protection Agency.
7. "Impaired water" means a Navigable water for which credible scientific data exists that satisfies the requirements of § 49-232 and that demonstrates that the water should be identified pursuant to 33 United States Code § 1313(d) and the regulations implementing that statute. A.R.S. § 49-231(1).
8. "Laboratory detection limit" means a "Method Reporting Limit" (MRL) or "Reporting Limit" (RL). These analogous terms describe the laboratory reported value, which is the lowest concentration level included on the calibration curve from the analysis of a pollutant that can be quantified in terms of precision and accuracy.
9. "Monitoring entity" means the Department or any person who collects physical, chemical, or biological data used for an impaired water identification or

a TMDL decision.

10. "Naturally occurring condition" means the condition of a surface water or segment that would have occurred in the absence of pollutant loadings as a result of human activity.

11. "Not attaining" means a surface water is assessed as impaired, but is not placed on the 303(d) List because:

- a. A TMDL is prepared and implemented for the surface water;
- b. An action, which meets the requirements of R18-11-604(D)(2)(h), is occurring and is expected to bring the surface water to attaining before the next 303(d) List submission; or
- c. The impairment of the surface water is due to pollution but not a pollutant, for which a TMDL load allocation cannot be developed.

12. "NPDES" means National Pollutant Discharge Elimination System.

13. "Planning List" means a list of surface waters and segments that the Department will review and evaluate to determine if the surface water or segment is impaired and whether a TMDL is necessary.

14. "Pollutant" means dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. 33 U.S.C. 1362(6). Characteristics of water, such as dissolved oxygen, pH, temperature, turbidity, and suspended sediment are considered pollutants if they result or may result in the non-attainment of a water quality standard.

15. "Pollution" means "the man-made or man-induced alteration of the chemical, physical, biological, and radiological integrity of water. 33 U.S.C. 1362(19).

16. "QAP" means a quality assurance plan detailing how environmental data operations are planned, implemented, and assessed for quality during the duration of a project.

17. "Sampling event" means one or more samples taken under consistent conditions on one or more days at a distinct station or location.

18. "SAP" means a site specific sampling and analysis plan that describes the specifics of sample collection to ensure that data quality objectives are met and that samples collected and analyzed are representative of surface water conditions at the time of sampling.

19. "Spatially independent sample" means a sample that is collected at a distinct station or location. The sample is independent if the sample was collected:

- a. More than 200 meters apart from other samples, or
- b. Less than 200 meters apart, and collected to characterize the effect of an intervening tributary, outfall or other pollution source, or significant hydrographic or hydrologic change.

20. "Temporally independent sample" means a sample that is collected at the same station or location more than seven days apart from other samples.

21. "Threatened" means that a surface water or segment is currently attaining its designated use, however, trend analysis, based on credible and scientifically defensible data, indicates that the surface water or segment is likely to be impaired before the next listing cycle.

22. "TMDL" means total maximum daily load.

23. "TMDL decision" means a decision by the Department to:

- a. Prioritize an impaired water for TMDL development,
- b. Develop a TMDL for an impaired water, or
- c. Develop a TMDL implementation plan.

24. "Total maximum daily load" means an estimation of the total amount of a pollutant from all sources that may be added to a water while still allowing the water to achieve and maintain applicable surface water quality standards. Each total maximum daily load shall include allocations for sources that contribute the pollutant to the water, as required by section 303(d) of the clean water act (33 United States Code section 1313(d)) and regulations implementing that statute to achieve applicable surface water quality standards. A.R.S. § 49-231(4).

25. "Water quality standard" means a standard composed of designated uses (classification of waters), the numerical and narrative criteria applied to the specific water uses or classification, the antidegradation policy, and moderating provisions, for example, mixing zones, site-specific alternative criteria, and exemptions, in A.A.C. Title 18, Chapter 11, Article 1.

26. "WQARF" means the water quality assurance revolving fund established under A.R.S. § 49-282.

#### **R18-11-602. Credible Data**

A. Data are credible and relevant to an impaired water identification or a TMDL decision when:

1. Quality Assurance Plan. A monitoring entity, which contribute data for an impaired water identification or a TMDL decision, provides the Department with a QAP that contains, at a minimum, the elements listed in subsections (A)(1)(a) through (A)(1)(f). The Department may accept a QAP containing less than the required elements if the Department determines that an element is not relevant to the sampling activity and that its omission will not impact the quality of the results based upon the type of pollutants to be sampled, the type of surface water, and the purpose of the sampling.

- a. An approval page that includes the date of approval and the signatures of the approving officials, including the project manager and project quality assurance manager;
- b. A project organization outline that identifies all key personnel, organizations, and laboratories involved in monitoring, including the specific roles and responsibilities of key personnel in carrying out the



procedures identified in the QAP and SAP, if applicable;

c. Sampling design and monitoring data quality objectives or a SAP that meets the requirements of subsection (A)(2) to ensure that:

- i. Samples are spatially and temporally representative of the surface water,
- ii. Samples are representative of water quality conditions at the time of sampling, and
- iii. The monitoring is reproducible;

d. The following field sampling information to assure that samples meet data quality objectives:

- i. Sampling and field protocols for each parameter or parametric group, including the sampling methods, equipment and containers, sample preservation, holding times, and any analysis proposed for completion in the field or outside of a laboratory;
- ii. Field and laboratory methods approved under subsection(A)(5);
- iii. Handling procedures to identify samples and custody protocols used when samples are brought from the field to the laboratory for analysis;
- iv. Quality control protocols that describe the number and type of field quality control samples for the project that includes, if appropriate for the type of sampling being conducted, field blanks, travel blanks, equipment blanks, method blanks, split samples, and duplicate samples;
- v. Procedures for testing, inspecting, and maintaining field equipment;
- vi. Field instrument calibration procedures that describe how and when field sampling and analytical instruments will be calibrated;
- vii. Field notes and records that describe the conditions that require documentation in the field, such as weather, stream flow, transect information, distance from water edge, water and sample depth, equipment calibration measurements, field observations of watershed activities, and bank conditions. Indicate the procedures implemented for maintaining field notes and records and the process used for attaching pertinent information to monitoring results to assist in data interpretation;
- viii. Minimum training and any specialized training necessary to do the monitoring, that includes the proper use and calibration of field equipment used to collect data, sampling protocols, quality assurance/quality control procedures, and

how training will be achieved;

e. Laboratory analysis methods and quality assurance/quality control procedures that assure that samples meet data quality objectives, including:

- i. Analytical methods and equipment necessary for analysis of each parameter, including identification of approved laboratory methods described in subsection (A)(5), and laboratory detection limits for each parameter;
- ii. The name of the designated laboratory, its license number, if licensed by the Arizona Department of Health Services, and the name of a laboratory contact person to assist the Department with quality assurance questions;
- iii. Quality controls that describe the number and type of laboratory quality control samples for the project, including, if appropriate for the type of sampling being conducted, field blanks, travel blanks, equipment blanks, method blanks, split samples, and duplicate samples;
- iv. Procedures for testing, inspecting, and maintaining laboratory equipment and facilities;
- v. A schedule for calibrating laboratory instruments, a description of calibration methods, and a description of how calibration records are maintained; and
- vi. Sample equipment decontamination procedures that outline specific methods for sample collection and preparation of equipment, identify the frequency of decontamination, and describe the procedures used to verify decontamination;

f. Data review, management, and use that includes the following:

- i. A description of the data handling process from field to laboratory, from laboratory to data review and validation, and from validation to data storage and use. Include the role and responsibility of each person for each step of the process, type of database or other storage used, and how laboratory and field data qualifiers are related to the laboratory result;
- ii. Reports that describe the intended frequency, content, and distribution of final analysis reports and project status reports;
- iii. Data review, validation, and verification that describes the procedure used to validate and verify data, the procedures used if errors are detected, and how data are accepted, rejected, or qualified; and
- iv. Reconciliation with data quality objectives that describes the process used to determine whether the data collected meets the project objectives, which may include discarding data, setting limits on data use, or revising data quality objectives.

## 2. Sampling and analysis plan.

a. A monitoring entity shall develop a SAP that contains, at a minimum, the following elements:

- i. The experimental design of the project, the project goals and objectives, and evaluation criteria for data results;
- ii. The background or historical perspective of the project;
- iii. Identification of target conditions, including a discussion of whether any weather, seasonal variations, stream flow, lake level, or site access may affect the project and the consideration of these factors;
- iv. The data quality objectives for measurement of data that describe in quantitative and qualitative terms how the data meet the project objectives of precision, accuracy, completeness, comparability, and representativeness;
- v. The types of samples scheduled for collection;
- vi. The sampling frequency;
- vii. The sampling periods;
- viii. The sampling locations and rationale for the site selection, how site locations are benchmarked, including scaled maps indicating approximate location of sites; and
- ix. A list of the field equipment, including tolerance range and any other manufacturer's specifications relating to accuracy and precision.

b. The Department may accept a SAP containing less than the required elements if the Department determines that an element is not relevant to the sampling activity and that its omission will not impact the quality of the results based upon the type of pollutants to be samples, the type of surface water, and the purpose of the sampling.

3. [Options] The monitoring entity may include any of the following in the QAP or SAP:

- a. The name, title, and role of each person and organization involved in the project, identifying specific roles and responsibilities for carrying out the procedures identified in the QAP and SAP;
- b. A distribution list of each individual and organization receiving a copy of the approved QAP and SAP;
- c. A table of contents;
- d. A health and safety plan;
- e. The inspection and acceptance requirements for supplies;
- f. The data acquisition that describes types of data not obtained through this monitoring activity, but used in the project;
- g. The audits and response actions that describe how field, laboratory, and data management activities and sampling personnel are evaluated to ensure data quality, including a description of how the project will

correct any problems identified during these assessments; and

h. The waste disposal methods that identify wastes generated in sampling and methods for disposal of those wastes.

4. Exceptions. The Department may determine that the following data are also credible and relevant to an impaired water identification or TMDL decision when data were collected, provided the conditions in subsections (A)(5), (A)(6), and (B) are met, and where the data were collected in the surface water or segment being evaluated for impairment:

- a. The data were collected before July 12, 2002 and the Department determines that the data yield results of comparable reliability to the data collected under subsections (A)(1) and (A)(2);
- b. The data were collected after July 12, 2002 as part of an ongoing monitoring effort by a governmental agency and the Department determines that the data yield results of comparable reliability to the data collected under subsections (A)(1) and (A)(2); or
- c. The instream water quality data were or are collected under the terms of a NPDES or AZPDES permit or a compliance order issued by the Department or EPA, a consent decree signed by the Department or EPA, or a sampling program approved by the Department or EPA under WQARF or CERCLA, and the Department determines that the data yield results of comparable reliability to data collected under subsections (A)(1) and (A)(2).

5. Data collection, preservation, and analytical procedures. The monitoring entity shall collect, preserve, and analyze data using methods of sample collection, preservation, and analysis established under A.A.C. R9-14-610.

6. Laboratory. The monitoring entity shall ensure that chemical and toxicological samples are analyzed in a state-licensed laboratory, a laboratory exempted by the Arizona Department of Health Services for specific analyses, or a federal or academic laboratory that can demonstrate proper quality assurance/quality control procedures substantially equal to those required by the Arizona Department of Health Services, and shall ensure that the laboratory uses approved methods identified in A.A.C. R9-14-610.

B. Documentation for data submission. The monitoring entity shall provide the Department with the following information either before or with data submission:

1. A copy of the QAP or SAP, or both, revisions to a previously submitted QAP or SAP, and any other information necessary for the Department to evaluate the data under subsection (A)(4);
2. The applicable dates of the QAP and SAP, including any revisions;



3. Written assurance that the methods and procedures specified in the QAP and SAP were followed;
4. The name of the laboratory used for sample analyses and its certification number, if the laboratory is licensed by the Arizona Department of Health Services;
5. The quality assurance/quality control documentation, including the analytical methods used by the laboratory, method number, detection limits, and any blank, duplicate, and spike sample information necessary to properly interpret the data, if different from that stated in the QAP or SAP;
6. The data reporting unit of measure;
7. Any field notes, laboratory comments, or laboratory notations concerning a deviation from standard procedures, quality control, or quality assurance that affects data reliability, data interpretation, or data validity; and
8. Any other information, such as complete field notes, photographs, climate, or other information related to flow, field conditions, or documented sources of pollutants in the watershed, if requested by the Department for interpreting or validating data.

- C. Record keeping. The monitoring entity shall maintain all records, including sample results, for the duration of the listing cycle. If a surface water or segment is added to the Planning List or to the 303(d) List, the Department shall coordinate with the monitoring entity to ensure that records are kept for the duration of the listing.

#### **R18-11-603. General Data Interpretation Requirements**

- A. The Department shall use the following data conventions to interpret data for impaired water identifications and TMDL decisions:
1. Data reported below laboratory detection limits.
    - a. When the analytical result is reported as  $<X$ , where  $X$  is the laboratory detection limit for the analyte and the laboratory detection limit is less than or equal to the surface water quality standard, consider the result as meeting the water quality standard:
      - i. Use these statistically derived values in trend analysis, descriptive statistics or modeling if there is sufficient data to support the statistical estimation of values reported as less than the laboratory detection limit; or
      - ii. Use one-half of the value of the laboratory detection limit in trend analysis, descriptive statistics, or modeling, if there is insufficient data to support the statistical estimation of values reported as less than the laboratory detection limit.

- b. When the sample value is less than or equal to the laboratory detection limit but the laboratory detection limit is greater than the surface water quality standard, shall not use the result for impaired water identifications or TMDL decisions;
2. Identify the field equipment specifications used for each listing cycle or TMDL developed. A field sample measurement within the manufacturer's specification for accuracy meets surface water quality standards;
3. Resolve a data conflict by considering the factors identified under the weight-of-evidence determination in R18-11-605(B);
4. When multiple samples from a surface water or segment are not spatially or temporally independent, or when lake samples are from multiple depths, use the following resultant value to represent the specific dataset:
  - a. The appropriate measure of central tendency for the dataset for:
    - i. A pollutant listed in the surface water quality standards 18 A.A.C. 11, Article 1, Appendix A, Table 1, except for nitrate or nitrate/nitrite;
    - ii. A chronic water quality standard for a pollutant listed in 18 A.A.C. 11, Article 1, Appendix A, Table 2;
    - iii. A surface water quality standard for a pollutant that is expressed as an annual or geometric mean;
    - iv. The surface water quality standard for temperature or the single sample maximum water quality standard for suspended sediment concentration, nitrogen, and phosphorus in R18-11-109;
    - v. The surface water quality standard for radiochemicals in R18-11-109(G); or
    - vi. Except for chromium, all single sample maximum water quality standards in R18-11-112.
  - b. The maximum value of the dataset for:
    - i. The acute water quality standard for a pollutant listed in 18 A.A.C. 11, Article 1, Appendix A, Table 2 and acute water quality standard in R18-11-112;
    - ii. The surface water quality standard for nitrate or nitrate/nitrite in 18 A.A.C. 11, Article 1, Appendix A, Table 1;
    - iii. The single sample maximum water quality standard for bacteria in subsections R18-11-109(A); or
    - iv. The 90th percentile water quality standard for nitrogen and phosphorus in R18-11-109(F) and R18-11-112.
  - c. The worst case measurement of the dataset for:
    - i. Surface water quality standard for dissolved oxygen under R18-11-109(E). For purposes of this subsection, worst case

measurement means the minimum value for dissolved oxygen;  
ii. Surface water quality standard for pH under R18-11-109(B). For purposes of this subsection, "worst case measurement" means both the minimum and maximum value for pH.

B. The Department shall not use the following data for placing a surface water or segment on the Planning List, the 303(d) List, or in making a TMDL decision.

1. Any measurement outside the range of possible physical or chemical measurements for the pollutant or measurement equipment,
2. Uncorrected data transcription errors or laboratory errors, and
3. An outlier identified through statistical procedures, where further evaluation determines that the outlier represents a valid measure of water quality but should be excluded from the dataset.

C. The Department may employ fundamental statistical tests if appropriate for the collected data and type of surface water when evaluating a surface water or segment for impairment or in making a TMDL decision. The statistical tests include descriptive statistics, frequency distribution, analysis of variance, correlation analysis, regression analysis, significance testing, and time series analysis.

D. The Department may employ modeling when evaluating a surface water or segment for impairment or in making a TMDL decision, if the method is appropriate for the type of waterbody and the quantity and quality of available data meet the requirements of R18-11-602. Modeling methods include:

- a. Better Assessment Science Integrating Source and Nonpoint Sources (BASINS),
- b. Fundamental statistics, including regression analysis,
- c. Hydrologic Simulation Program-Fortran (HSPF),
- d. Spreadsheet modeling, and
- e. Hydrologic Engineering Center (HEC) programs developed by the Army Corps of Engineers.

**R18-11-604. Types of Surface Waters Placed on the Planning List and 303(d) List**

A. The Department shall evaluate, at least every five years, Arizona's surface waters by considering all readily available data.

1. The Department shall place a surface water or segment on:
  - a. The Planning List if it meets any of the criteria described in subsection (D), or
  - b. The 303(d) List if it meets the criteria for listing described in

subsection (E).

2. The Department shall remove a surface water or segment from the Planning List based on the requirements in R18-11-605(E)(1) or from the 303(d) List, based on the requirements in R18-11-605(E)(2).
3. The Department may move surface waters or segments between the Planning List and the 303(d) List based on the criteria established in R18-11-604 and R18-11-605.

B. When placing a surface water or segment on the Planning List or the 303(d) List, the Department shall list the stream reach, derived from EPA's Reach File System or *National Hydrography Dataset*, or the entire lake, unless the data indicate that only a segment of the stream reach or lake is impaired or not attaining its designated use, in which case, the Department shall describe only that segment for listing.

C. Exceptions. The Department shall not place a surface water or segment on either the Planning List or the 303(d) List if the non-attainment of a surface water quality standard is due to one of the following:

1. Pollutant loadings from naturally occurring conditions alone are sufficient to cause a violation of applicable water quality standards;
2. The data were collected within a mixing zone or under a variance or nutrient waiver established in a NPDES or AZPDES permit for the specific parameter and the result does not exceed the alternate discharge limitation established in the permit. The Department may use data collected within these areas for modeling or allocating loads in a TMDL decision; or
3. An activity exempted under R18-11-117, R18-11-118, or a condition exempted under R18-11-119.

**D. Planning List.**

1. The Department shall:
  - a. Use the Planning List to prioritize surface waters for monitoring and evaluation as part of the Department's watershed management approach;
  - b. Provide the Planning List to EPA; and
  - c. Evaluate each surface water and segment on the Planning List for impairment based on the criteria in R18-11-605(D) to determine the source of the impairment.
2. The Department shall place a surface water or segment on the Planning List based the criteria in R18-11-605(C). The Department may also include a surface water or segment on the Planning List when:
  - a. A TMDL is completed for the pollutant and approved by EPA;
  - b. The surface water or segment is on the 1998 303(d) List but the



dataset used for the listing:

- i. Does not meet the credible data requirements of R18-11-602, or
  - ii. Contains insufficient samples to meet the data requirements under R18-11-605(D);
- c. Some monitoring data exist but there are insufficient data to determine whether the surface water or segment is impaired or not attaining, including:
- i. A numeric surface water quality standard is exceeded, but there are not enough samples or sampling events to fulfill the requirements of R18-11-605(D);
  - ii. Evidence exists of a narrative standard violation, but the amount of evidence is insufficient, based on narrative implementation procedures and the requirements of R18-11-605(D)(3);
  - iii. Existing monitoring data do not meet credible data requirements in R18-11-602; or
  - iv. A numeric surface water quality standard is exceeded, but there are not enough sample results above the laboratory detection limit to support statistical analysis as established in R18-11-603(A)(1).
- d. The surface water or segment no longer meets the criteria for impairment based on a change in the applicable surface water quality standard or a designated use approved by EPA under section 303(c)(1) of the Clean Water Act, but insufficient current or original monitoring data exist to determine whether the surface water or segment will meet current surface water quality standards;
- e. Trend analysis using credible and scientifically defensible data indicate that surface water quality standards may be exceeded by the next assessment cycle;
- f. The exceedance of surface water quality standards is due to pollution, but not a pollutant;
- g. Existing data were analyzed using methods with laboratory detection limits above the numeric surface water quality standard but analytical methods with lower laboratory detection limits are available;
- h. The surface water or segment is expected to attain its designated use by the next assessment as a result of existing or proposed technology-based effluent limitations or other pollution control requirements under local, state, or federal authority. The appropriate entity shall provide the Department with the following documentation to support placement on the Planning List:
- i. Verification that discharge controls are required and enforceable;

- ii. Controls are specific to the surface water or segment, and pollutant of concern;
- iii. Controls are in place or scheduled for implementation; and
- iv. There are assurances that the controls are sufficient to bring about attainment of water quality standards by the next 303(d) List submission; or

- i. The surface water or segment is threatened due to a pollutant and, at the time the Department submits a final 303(d) List to EPA, there are no federal regulations implementing section 303(d) of the Clean Water Act that require threatened waters be included on the list.

E. 303(d) List. The Department shall:

1. Place a surface water or segment on the 303(d) List if the Department determines:
  - a. Based on R18-11-605(D), that the surface water or segment is impaired due to a pollutant and that a TMDL decision is necessary; or
  - b. That the surface water or segment is threatened due to a pollutant and, at the time the Department submits a final 303(d) List to EPA, there are federal regulations implementing section 303(d) of the Clean Water Act that require threatened waters be included on the list.
2. Provide public notice of the 303(d) List according to the requirements of A.R.S. § 49-232 and submit the 303(d) List according to section 303(d) of the Clean Water Act.

**R18-11-605. Evaluating A Surface Water or Segment For Listing and Delisting**

A. The Department shall compile and evaluate all reasonably current, credible, and scientifically defensible data to determine whether a surface water or segment is impaired or not attaining.

B. Weight-of-evidence approach.

1. The Department shall consider the following concepts when evaluating data:
  - a. Data or information collected during critical conditions may be considered separately from the complete dataset, when the data show that the surface water or segment is impaired or not attaining its designated use during those critical conditions, but attaining its uses during other periods. Critical conditions may include stream flow, seasonal periods, weather conditions, or anthropogenic activities;
  - b. Whether the data indicate that the impairment is due to persistent, seasonal, or recurring conditions. If the data do not represent persistent, recurring, or seasonal conditions, the Department may place the surface water or segment on the Planning List;

c. Higher quality data over lower quality data when making a listing decision. Data quality is established by the reliability, precision, accuracy, and representativeness of the data, based on factors identified in R18-11-602(A) and (B), including monitoring methods, analytical methods, quality control procedures, and the documented field and laboratory quality control information submitted with the data. The Department shall consider the following factors when determining higher quality data:

- i. The age of the measurements. Newer measurements are weighted heavier than older measurements, unless the older measurements are more representative of critical flow conditions;
- ii. Whether the data provide a direct measure of an impact on a designated use. Direct measurements are weighted heavier than measurements of an indicator or surrogate parameter; or
- iii. The amount or frequency of the measurements. More frequent data collection are weighted heavier than nominal datasets.

2. The Department shall evaluate the following factors to determine if the water quality evidence supports a finding that the surface water or segment is impaired or not attaining:

- a. An exceedance of a numeric surface water quality standard based on the criteria in subsections (C)(1), (C)(2), (D)(1), and (D)(2);
- b. An exceedance of a narrative surface water quality standard based on the criteria in subsections (C)(3) and (D)(3);

c. Additional information that determines whether a water quality standard is exceeded due to a pollutant, suspected pollutant, or naturally occurring condition:

- i. Soil type, geology, hydrology, flow regime, biological community, geomorphology, climate, natural process, and anthropogenic influence in the watershed;
- ii. The characteristics of the pollutant, such as its solubility in water, bioaccumulation potential, sediment sorption potential, or degradation characteristics, to assist in determining which data more accurately indicate the pollutant's presence and potential for causing impairment; and
- iii. Available evidence of direct or toxic impacts on aquatic life, wildlife, or human health, such as fish kills and beach closures, where there is sufficient evidence that these impacts occurred due to water quality conditions in the surface water.

d. Other available water quality information, such as NPDES or AZPDES water quality discharge data, as applicable.

e. If the Department determines that a surface water or segment does

not merit listing under numeric water quality standards based on criteria in subsections (C)(1), (C)(2), (D)(1), or (D)(2) for a pollutant, but there is evidence of a narrative standard exceedance in that surface water or segment under subsection (D)(3) as a result of the presence of the same pollutant, the Department shall list the surface water or segment as impaired only when the evidence indicates that the numeric water quality standard is insufficient to protect the designated use of the surface water or segment and the Department justifies the listing based on any of the following:

- i. The narrative standard data provide a more direct indication of impairment as supported by professionally prepared and peer-reviewed publications;
- ii. Sufficient evidence of impairment exists due to synergistic effects of pollutant combinations or site-specific environmental factors; or
- iii. The pollutant is bioaccumulative, relatively insoluble in water, or has other characteristics that indicate it is occurring in the specific surface water or segment at levels below the laboratory detection limits, but at levels sufficient to result in an impairment.

3. The Department may consider a single line of water quality evidence when the evidence is sufficient to demonstrate that the surface water or segment is impaired or not attaining.

#### C. Planning List.

1. When evaluating a surface water or segment for placement on the Planning List.

a. Consider at least ten spatially or temporally independent samples collected over three or more temporally independent sampling events; and

b. Determine numeric water quality standards exceedances. The Department shall:

- i. Place a surface water or segment on the Planning List following subsection (B), if the number of exceedances of a surface water quality standard is greater than or equal to the number listed in Table 1, which provides the number of exceedances that indicate a minimum of a 10 percent exceedance frequency with a minimum of a 80 percent confidence level using a binomial distribution for a given sample size; or
- ii. For sample datasets exceeding those shown in Table 1, calculate the number of exceedances using the following



equation:  $(X \leq n, p)$  where  $n$  = number of samples;  $p$  = exceedance probability of 0.1;  $x$  = smallest number of exceedances required for listing with “ $n$ ” samples; and confidence level 80 percent.

2. When there are less than ten samples, the Department shall place a surface water or segment on the Planning List following subsection (B), if three or more temporally independent samples exceed the following surface water quality standards:

- a. The surface water quality standard for a pollutant listed in 18 A.A.C. 11, Article 1, Appendix A, Table 1, except for nitrate or nitrate/nitrite;
- b. The surface water quality standard for temperature or the single sample maximum water quality standard for suspended sediment concentration, nitrogen, and phosphorus in R18-11-109;
- c. The surface water quality standard for radiochemicals in R18-11-109(G);
- d. The surface water quality standard for dissolved oxygen under R18-11-109(E);
- e. The surface water quality standard for pH under R18-11-109(B); or
- f. The following surface water quality standards in R18-11-112:
  - i. Single sample maximum standards for nitrogen and phosphorus,
  - ii. All metals except chromium, or
  - iii. Turbidity.

3. The Department shall place a surface water or segment on the Planning List if information in subsections (B)(2)(c), (B)(2)(d), and (B)(2)(e) indicates that a narrative water quality standard violation exists, but no narrative implementation procedure required under A.R.S. § 49-232(F) exists to support use of the information for listing.

#### D. 303(d) List.

1. When evaluating a surface water or segment for placement on the 303(d) List.

a. Consider at least 20 spatially or temporally independent samples collected over three or more temporally independent sampling events; and

b. Determine numeric water quality standards exceedances. The Department shall:

- i. Place a surface water or segment on the 303(d) List, following subsection (B), if the number of exceedances of a surface water quality standard is greater than or equal to the number listed in Table 2, which provides the number of exceedances that indicate a minimum of a 10 percent exceedance frequency with a minimum of a 90 percent

confidence level using a binomial distribution, for a given sample size; or

ii. For sample datasets exceeding those shown in Table 2, calculate the number of exceedances using the following equation:  $(X \leq n, p)$  where  $n$  = number of samples;  $p$  = exceedance probability of 0.1;  $x$  = smallest number of exceedances required for listing with “ $n$ ” samples; and confidence level 90 percent.

2. The Department shall place a surface water or segment on the 303(d) List, following subsection (B) without the required number of samples or numeric water quality standard exceedances under subsection (D)(1), if either the following conditions occur:

a. More than one temporally independent sample in any consecutive three-year period exceeds the surface water quality standard in:

- i. The acute water quality standard for a pollutant listed in 18 A.A.C. 11, Article 1, Appendix A, Table 2 and the acute water quality standards in R18-11-112;
- ii. The surface water quality standard for nitrate or nitrate/nitrite in 18 A.A.C. 11, Article 1, Appendix A, Table 1; or
- iii. The single sample maximum water quality standard for bacteria in subsections R18-11-109(A).

b. More than one exceedance of an annual mean, 90th percentile, aquatic and wildlife chronic water quality standard, or a bacteria 30-day geometric mean water quality standard occurs, as specified in R18-11-109, R18-11-110, R18-11-112, or 18 A.A.C. 11, Article 1, Appendix A, Table 2.

3. Narrative water quality standards exceedances. The Department shall place a surface water or segment on the Planning List if the listing requirements are met under A.R.S. § 49-232(F).

#### E. Removing a surface water, segment, or pollutant from the Planning List or the 303(d) List.

1. Planning List. The Department shall remove a surface water, segment, or pollutant from the Planning List when:

a. Monitoring activities indicate that:

- i. There is sufficient credible data to determine that the surface water or segment is impaired under subsection (D), in which case the Department shall place the surface water or segment on the 303(d) List. This includes surface waters with an EPA approved TMDL when the Department determines that the TMDL strategy is insufficient for the surface water or segment to attain water quality standards; or

- ii. There is sufficient credible data to determine that the surface water or segment is attaining all designated uses and standards.
- b. All pollutants for the surface water or segment are delisted.
- 2. 303(d) List. The Department shall:
  - a. Remove a pollutant from a surface water or segment from the 303(d) List based on one or more of the following criteria:
    - i. The Department developed, and EPA approved, a TMDL for the pollutant;
    - ii. The data used for previously listing the surface water or segment under R18-11-605(D) is superseded by more recent credible and scientifically defensible data meeting the requirements of R18-11-602, showing that the surface water or segment meets the applicable numeric or narrative surface water quality standard. When evaluating data to remove a pollutant from the 303(d) List, the monitoring entity shall collect the more recent data under similar hydrologic or climatic conditions as occurred when the samples were taken that indicated impairment, if those conditions still exist;
    - iii. The surface water or segment no longer meets the criteria for impairment based on a change in the applicable surface water quality standard or a designated use approved by EPA under section 303(c)(1) of the Clean Water Act;
    - iv. The surface water or segment no longer meets the criteria for impairment for the specific narrative water quality standard based on a change in narrative water quality standard implementation procedures;
    - v. A re-evaluation of the data indicate that the surface water or segment does not meet the criteria for impairment because of a deficiency in the original analysis; or
    - vi. Pollutant loadings from naturally occurring conditions alone are sufficient to cause a violation of applicable water quality standards;
  - b. Remove a surface water, segment, or pollutant from the 303(d) List, based on criteria that are no more stringent than the listing criteria under subsection (D);
  - c. Remove a surface water or segment from the 303(d) List if all pollutants for the surface water or segment are removed from the list;
  - d. Remove a surface water, segment, or pollutant, from the 303(d) List and place it on the Planning List, if:
    - i. The surface water, segment or pollutant was on the 1998 303(d) List and the dataset used in the original listing does not meet the credible data requirements under R18-11-602, or

- contains insufficient samples to meet the data requirements under subsection (D); or
- ii. The monitoring data indicate that the impairment is due to pollution, but not a pollutant.

**R18-11-606. TMDL Priority Criteria for 303(d) Listed Surface Waters or Segments**

A. In addition to the factors specified in A.R.S. § 49-233(C), the Department shall consider the following when prioritizing an impaired water for development of TMDLs:

- 1. A change in a water quality standard;
- 2. The date the surface water or segment was added to the 303(d) List;
- 3. The presence in a surface water or segment of species listed as threatened or endangered under section 4 of the Endangered Species Act;
- 4. The complexity of the TMDL;
- 5. State, federal, and tribal policies and priorities; and
- 6. The efficiencies of coordinating TMDL development with the Department's surface water monitoring program, the watershed monitoring rotation, or with remedial programs.

- B. The Department shall prioritize an impaired surface water or segment for TMDL development based on the factors specified in A.R.S. § 49-233(C) and subsection (A) as follows:
  - 1. Consider an impaired surface water or segment a high priority if:
    - a. The listed pollutant poses a substantial threat to the health and safety of humans, aquatic life, or wildlife based on:
      - i. The number and type of designated uses impaired;
      - ii. The type and extent of risk from the impairment to human health, aquatic life, or wildlife;
      - iii. The pollutant causing the impairment, or
      - iv. The severity, magnitude, and duration the surface water quality standard was exceeded;
    - b. A new or modified individual NPDES or AZPDES permit is sought for a new or modified discharge to the impaired water;
    - c. The listed surface water or segment is listed as a unique water in A.A.C. R18-11-112 or is part of an area classified as a "wilderness area," "wild and scenic river," or other federal or state special protection of the water resource;
    - d. The listed surface water or segment contains a species listed as threatened or endangered under the federal Endangered Species Act and the presence of the pollutant in the surface water or segment is likely to



jeopardize the listed species;

e. A delay in conducting the TMDL could jeopardize the Department's ability to gather sufficient credible data necessary to develop the TMDL;

f. There is significant public interest and support for the development of a TMDL;

g. The surface water or segment has important recreational and economic significance to the public; or

h. The pollutant is listed for eight years or more.

2. Consider an impaired surface water or segment a medium priority if:

a. The surface water or segment fails to meet more than one designated use;

b. The pollutant exceeds more than one surface water quality standard;

c. A surface water quality standard exceedance is correlated to seasonal conditions caused by natural events, such as storms, weather patterns, or lake turnover;

d. It will take more than two years for proposed actions in the watershed to result in the surface water attaining applicable water quality standards;

e. The type of pollutant and other factors relating to the surface water or segment make the TMDL complex; or

f. The administrative needs of the Department, including TMDL schedule commitments with EPA, permitting requirements, or basin priorities that require completion of the TMDL.

3. Consider an impaired surface water or segment a low priority if:

a. The Department has formally submitted a proposal to delist the surface water, segment, or pollutant to EPA based on R18-11-605(E)(2). If the Department makes the submission outside the listing process cycle, the change in priority ranking will not be effective until EPA approves the submittal;

b. The Department has modified, or formally proposed for modification, the designated use or applicable surface water quality standard, resulting in an impaired water no longer being impaired, but the modification has not been approved by EPA;

c. The surface water or segment is expected to attain surface water quality standards due to any of the following:

i. Recently instituted treatment levels or best management practices in the drainage area,

ii. Discharges or activities related to the impairment have ceased, or

iii. Actions have been taken and controls are in place or scheduled for implementation that will likely to bring the surface water back into compliance;

d. The surface water or segment is ephemeral or intermittent. The Department shall re-prioritize the surface water or segment if the presence of the pollutant in the listed water poses a threat to the health and safety of humans, aquatic life, or wildlife using the water, or the pollutant is contributing to the impairment of a downstream perennial surface water or segment;

e. The pollutant poses a low ecological and human health risk;

f. Insufficient data exist to determine the source of the pollutant load;

g. The uncertainty of timely coordination with national and international entities concerning international waters;

h. Naturally occurring conditions are a major contributor to the impairment; and

i. No documentation or effective analytical tools exist to develop a TMDL for the surface water or segment with reasonable accuracy.

C. The Department will target surface waters with high priority factors in subsections (B)(1)(a) through (B)(1)(d) for initiation of TMDLs within two years following EPA approval of the 303(d) List.

D. The Department may shift priority ranking of a surface water or segment for any of the following reasons:

1. A change in federal, state, or tribal policies or priorities that affect resources to complete a TMDL;

2. Resource efficiencies for coordinating TMDL development with other monitoring activities, including the Department's ambient monitoring program that monitors watersheds on a 5-year rotational basis;

3. Resource efficiencies for coordinating TMDL development with Department remedial or compliance programs;

4. New information is obtained that will revise whether the surface water or segment is a high priority based on factors in subsection (B); and

5. Reduction or increase in staff or budget involved in the TMDL development.

E. The Department may complete a TMDL initiated before July 12, 2002 for a surface water or segment that was listed as impaired on the 1998 303(d) List but does not qualify for listing under the criteria in R18-11-605, if:

1. The TMDL investigation establishes that the water quality standard is not being met and the allocation of loads is expected to bring the surface water into compliance with standards,

2. The Department estimates that more than 50 percent of the cost of

completing the TMDL has been spent,

3. There is community involvement and interest in completing the TMDL, or

4. The TMDL is included within an EPA-approved state workplan initiated before July 12, 2002.



**Table 1. [Planning List] Minimum Number of Samples Exceeding the Numeric Standard**

Number of Samples		Number of Samples Exceeding Standard	Number of Samples		Number of Samples Exceeding Standard	Number of Samples		Number of Samples Exceeding Standard
From	To		From	To		From	To	
10	15	3	182	190	23	368	376	43
16	23	4	191	199	24	377	385	44
24	31	5	200	208	25	386	395	45
32	39	6	209	218	26	396	404	46
40	47	7	219	227	27	405	414	47
48	56	8	228	236	28	415	423	48
57	65	9	237	245	29	424	432	49
66	73	10	246	255	30	433	442	50
74	82	11	256	264	31	443	451	51
83	91	12	265	273	32	452	461	52
92	100	13	274	282	33	462	470	53
101	109	14	283	292	34	471	480	54
110	118	15	293	301	35	481	489	55
119	126	16	302	310	36	490	499	56
127	136	17	311	320	37	500		57
137	145	18	321	329	38	See calculation in R18-11-605.C.1.b.ii if dataset is larger than 500 samples.		
146	154	19	330	338	39			
155	163	20	339	348	40			
164	172	21	349	357	41			
173	181	22	358	367	42			

**Table 2. [Impaired Waters] Minimum Number of Samples Exceeding the Numeric Standard**

MINIMUM NUMBER OF SAMPLES EXCEEDING THE NUMERIC STANDARD								
Number of Samples		Number of Samples Exceeding Standard	Number of Samples		Number of Samples Exceeding Standard	Number of Samples		Number of Samples Exceeding Standard
From	To		From	To		From	To	
20	25	5	183	191	25	362	370	45
26	32	6	192	199	26	371	379	46
33	40	7	200	208	27	380	388	47
41	47	8	209	217	28	389	397	48
48	55	9	218	226	29	398	406	49
56	63	10	227	235	30	407	415	50
64	71	11	236	244	31	416	424	51
72	79	12	245	253	32	425	434	52
80	88	13	254	262	33	435	443	53
89	96	14	263	270	34	444	452	54
97	104	15	271	279	35	453	461	55
105	113	16	280	288	36	462	470	56
114	121	17	289	297	37	471	479	57
122	130	18	298	306	38	480	489	58
131	138	19	307	315	39	490	498	59
139	147	20	316	324	40	499	500	60
148	156	21	325	333	41	See calculation in R18-11-605.D.1.b.ii if dataset is larger than 500 samples.		
157	164	22	334	343	42			
165	173	23	344	352	43			
174	182	24	353	361	44			



## APPENDIX C. Arizona's Surface and Ground Water Quality Standards

SELECTED ARIZONA SURFACE WATER QUALITY NUMERIC STANDARDS (excluding VOCs, SOCs, and pesticides not used in this assessment) Standards revisions adopted in 2002 shown as <b>bold</b> and <i>italics</i> .				
PARAMETER		DESIGNATED USE(S)	STANDARD OR ASSESSMENT CRITERIA	CHRONIC STANDARDS New methods to assess chronic standard violations
Ammonia (NH3)		A&Wc/A&Ww	Standard varies by pH., see table in standards.	<i>New standard, varies by temperature and pH</i>
Antimony (Sb)	dissolved	A&Wc/A&Ww A&Wedw	88 µg/L 1,000 µg/L	30 µg/L 600 µg/L
	total	DWS FBC/PBC FC	6 µg/L <b>560 µg/L</b> <b>4,300 µg/L</b>	NA
Arsenic (As)	dissolved	A&Wc/A&Ww/A&Wedw A&We	360 µg/L 440 µg/L	190 µg/L <b>NA</b>
	total	DWS/FBC AGL PBC FC AGI People's Canyon Creek (Unique Waters)	50 µg/L 200 µg/L <b>420 µg/L</b> 1450 µg/L 2,000 µg/L 20 µg/L	NA
Barium (Ba)	dissolved	FBC/PBC	<b>98,000 µg/L</b>	NA
	total	DWS	2,000 µg/L	
Beryllium (Be)	dissolved	A&Wc/A&Ww/A&Wedw	65 µg/L	5.3 µg/L
	total	DWS FC PBC/FBC	4 µg/L <b>1,130 µg/L</b> <b>2,800 µg/L</b>	NA NA NA
Boron (B)	total	DWS AGI FBC/PBC	630 µg/L 1,000 µg/L <b>126,000 µg/L</b>	NA
Cadmium (Cd)	dissolved	A&W	<i>Standard varies by water hardness*, see published standards.</i>	<i>Standard varies by hardness*, see published standards.</i>
	total	DWS FC AgI/AgL FBC/PBC	5 µg/L <b>84 µg/L</b> 50 µg/L <b>700 µg/L</b>	NA
Chlorine (total residual) (Cl)		A&Wc/A&Ww/A&Wedw DWS FBC/PBC	11 ug/L <b>700 µg/L</b> <b>140,000 µg/L</b>	5 ug/L

SELECTED ARIZONA SURFACE WATER QUALITY NUMERIC STANDARDS (excluding VOCs, SOC's, and pesticides not used in this assessment) Standards revisions adopted in 2002 shown as <b>bold</b> and <i>italics</i> .				
PARAMETER		DESIGNATED USE(S)	STANDARD OR ASSESSMENT CRITERIA	CHRONIC STANDARDS New methods to assess chronic standard violations
Chromium (Cr)	dissolved	Unique Waters standards for: West Fork Little Colorado River, above Government Springs Oak Creek and West Fork Oak Creek	10 µg/L 5 µg/L	
	total	DWS/FBC/PBC AqI/AqL	<b>100 µg/L</b> 1,000 µg/L	NA
Chromium III (Cr III)	dissolved	A&Ww/A&Wc/A&We/A&Wedw	<i>Standard varies by water hardness*, see published standards.</i>	<i>Standard varies by hardness*, see published standards.</i>
	total	DWS FC FBC/PBC	10,500 µg/L 1,010,000 µg/L <b>2,100,000 µg/L</b>	NA
Chromium VI (Cr VI)	dissolved	A&Wc/A&Ww/A&Wedw/ A&We	16 µg/L 34 µg/L	11 µg/L <b>NA</b>
	total	DWS FC FBC/PBC	21 <b>2,000 µg/L</b> <b>4,200 µg/L</b>	NA
Copper (Cu)	dissolved	A&Ww/A&Wc/A&We/A&Wedw	<i>Standard varies by water hardness*, see published standards.</i>	<i>Standard varies by hardness*, see published standards.</i>
		Rio de Flag below WWTP outfall	<b>36 µg/L</b>	
	total	AgL DWS/FBC/PBC AqI	500 µg/L <b>1,300 µg/L</b> 5,000 µg/L	NA
Cyanide (Cn)	total	A&Wc A&Ww/A&Wedw A&We AgL, DWS FBC/PBC FC	22 µg/L 41 µg/L 84 µg/L 200 µg/L <b>28,000 µg/L</b> <b>215,000 µg/L</b>	5.2 µg/L 9.7 µg/L <b>NA</b>
Dissolved Oxygen (DO)		A&Ww A&Wc A&Wedw	>6.0 mg/L >7.0 mg/L Applies 3 hours after sunrise to sunset >3.0 mg/L Applies sunset to 3 hours after sunrise >1.0 mg/L note: in compliance if % saturation is = or > 90%	
		West Fork Little Colorado (Unique Waters) Peoples Canyon Creek (Unique Waters) Cienega Creek (Unique Waters) Bonita Creek (Unique Waters)	no decrease due to discharge	



**SELECTED ARIZONA SURFACE WATER QUALITY NUMERIC STANDARDS (excluding VOCs, SOC, and pesticides not used in this assessment)**  
**Standards revisions adopted in 2002 shown as *bold* and *italics*.**

PARAMETER		DESIGNATED USE(S)	STANDARD OR ASSESSMENT CRITERIA	CHRONIC STANDARDS New methods to assess chronic standard violations
DDE (metabolite of DDT) p,p'-Dichlorodiphenyldichloroethylene		AgI, AgL, FC	0.001	--
		DWS	0.1	--
		A&Wc	1.1 µg/L	0.001
		A&Ww, A&Wedw	1.1 µg/L	0.02
		A&We	1.1 µg/L	--
		FBC/PBC	4.1	--
Escherichia coli		FBC	<i>geometric mean (4 sample minimum) = 126 CFU/100ml</i>	
		PBC	<i>single sample maximum = 235 CFU/100ml</i> <i>geometric mean (4 sample minimum) = 126 CFU/100ml</i> <i>single sample maximum = 576 CFU/100ml</i>	
Fluoride (F)		DWS	4,000 µg/L (4 mg/L)	NA
		FBC/PBC	<b>84,000 µg/L (84 mg/L)</b>	
Lead (Pb)	dissolved	A&Ww/A&Wc/A&We/A&Wedw	<i>Standard varies by water hardness*, see published standards.</i>	<i>Standard varies by hardness*, see published standards.</i>
	total	DWS/ FBC/PBC AgL AgI	15 µg/L 100 µg/L 10,000 µg/L	NA
Manganese (Mn)		DWS	980 µg/L	NA
		AgI FBC/PBC Unique Waters standards for: People's Canyon Creek, Burro Creek, and Francis Creek	10,000 µg/L 196,000 µg/L 500 µg/L	
Mercury (Hg)	dissolved	A&Wc/A&Ww A&Wedw A&We	2.4 µg/L 2.6 µg/L 5.0 µg/L	0.01 µg/L 0.2 µg/L <b>NA</b>
	total	FC DWS AgL FBC/PBC	0.6 µg/L 2 µg/L 10 µg/L <b>420 µg/L</b>	NA
Nickel (Ni)	dissolved	A&W	<i>Standard varies by water hardness*, see published standards.</i>	<i>Standard varies by hardness*, see published standards.</i>
	total	DWS FC FBC/PBC	140 µg/L 4,600 µg/L <b>28,000 µg/L</b>	
Nitrate (as nitrogen) (NO3)		DWS mean value San Pedro (Curtiss-Benson) FBC/PBC	10,000 µg/L (10 mg/L) 10,000 µg/L (10 mg/L) <b>2,240,000 µg/L (2,240 mg/L)</b>	NA
Nitrate/Nitrite (as nitrogen) (NO3/NO2)		DWS	10,000 µg/L (10 mg/L)	

SELECTED ARIZONA SURFACE WATER QUALITY NUMERIC STANDARDS (excluding VOCs, SOCs, and pesticides not used in this assessment) Standards revisions adopted in 2002 shown as <b>bold and italics</b> .				
PARAMETER		DESIGNATED USE(S)	STANDARD OR ASSESSMENT CRITERIA	CHRONIC STANDARDS New methods to assess chronic standard violations
Nitrite (as nitrogen) (NO <sub>2</sub> )		DWS FBC/PBC	1,000 µg/L (1 mg/L) <b>140,000 µg/L (140 mg/L)</b>	NA
Nitrogen (N)	total	See nutrient chart below		
pH		A&W/FBC/PBC/AgL DWS AgI All waters except Unique Waters Unique Water standards for: Bonita Creek, Cienega Creek, West Fork Little Colorado, Oak Creek, and West Fork Oak Creek	6.5 - 9.0 5.0 - 9.0 4.5 - 9.0 Maximum change due to discharge = 0.5 No change due to discharge	
Phosphorus (P)	total	See nutrient chart below		
Selenium (Se)	total	A&Ww/A&Wc AgL A&We A&Wedw AgL/DWS FBC/PBC FC	20 µg/L 20 µg/L 33 µg/L 50 µg/L 50 µg/L <b>7,000 µg/L</b> 9,000 µg/L	2 µg/L NA <b>NA</b> 2 µg/L NA NA NA
Silver (Ag)	dissolved	A&Ww/A&Wc/A&We/A&Wedw	<i>Standard varies by water hardness*, see published standards.</i>	<i>Standard varies by hardness*, see published standards.</i>
	total	DWS FBC/PBC FC	35 µg/L 7,000 µg/L <b>107,700 µg/L</b>	NA
Suspended Sediment Concentration		A&Wc, A&Ww	<i>Geometric mean (4 sample minimum) of samples at or near base flow</i> <b>80 mg/L</b>	
Sulfides (S <sub>2</sub> )		A&W	100 µg/L (0.1 mg/L) <i>applies only in upper layer in a lake</i>	NA
Temperature (maximum increase due to discharge)		A&Wc A&Ww/A&Wedw Unique Water standards for: Bonita Creek, Cienega Creek, West Fork Little Colorado, and People's Canyon	1.0 °C 3.0 °C no increase due to discharge	NA
Thallium (Tl)	dissolved	A&Wc/A&Ww/A&Wedw	700 µg/L	150 µg/L
	total	DWS FC FBC/PBC	2 µg/L <b>7.2 µg/L</b> <b>112 µg/L</b>	NA



SELECTED ARIZONA SURFACE WATER QUALITY NUMERIC STANDARDS (excluding VOCs, SOC's, and pesticides not used in this assessment) Standards revisions adopted in 2002 shown as <b>bold and italics</b> .				
PARAMETER		DESIGNATED USE(S)	STANDARD OR ASSESSMENT CRITERIA	CHRONIC STANDARDS New methods to assess chronic standard violations
Total Dissolved Solids (TDS)		Colorado River: below Hoover Dam below Parker Dam at Imperial Dam	NA	(flow-weighted average annual) 723 mg/L 747 mg/L 879 mg/L
		Unique Water standards for: West Fork Little Colorado River, Bonita Creek, & Cienega Creek	no increase due to discharge	NA
Turbidity		Oak Creek (Unique Waters)Peoples Canyon Creek (Unique Waters) Cienega Creek (Unique Waters) Bonita Creek (Unique Waters)	3 NTU change due to discharge 5 NTU change due to discharge 10 NTU 15 NTU	NA
		Former standards: A&Wc (lakes and streams) A&Ww (lakes) A&Ww and A&Wedw (streams)	Former standards 10 NTU 25 NTU 50 NTU	
Uranium (Ur)	dissolved	DWS	35 µg/L	NA
Zinc (Zn)	dissolved	A&Ww/A&Wc/A&We/A&Wedw	<b><i>Standard varies by water hardness*, see published standards.</i></b>	<b><i>Standard varies by hardness*, see published standards.</i></b>
	total	DWS Agl AgL FC FBC/PBC	2,100 µg/L 10,000 µg/L 25,000 µg/L <b><i>69,000 µg/L</i></b> <b><i>420,000 µg/L</i></b>	NA

\*Dissolved metal standards are calculated using equations published with the surface water standards. In these equations, hardness (expressed as CaCO<sub>3</sub>) cannot exceed 400 mg/L; therefore, use 400 mg/L hardness if result is greater than 400 mg/L.

SURFACE WATER QUALITY STANDARDS FOR RADIOCHEMICALS		
Radiochemical	Designated Use	Standard (mean value)
Gross Alpha (excluding radon and uranium)	DWS	15 pCi/L
Radium-226 + Radium-228	DWS	5 pCi/L
Strontium 90	DWS	8 pCi/L
Tritium	DWS	20,000 pCi/L

SURFACE WATER QUALITY NUTRIENT STANDARDS			
WATERSHED OR SITE SPECIFIC LOCATION	Annual Mean	90th Percentile	Single Sample Max
Verde River and tributaries -- above Bartlett Lake	Phosphorus 0.10 mg/L Nitrogen 1.00 mg/L	Phosphorus 0.30 mg/L Nitrogen 1.50 mg/L	Phosphorus 1.00 mg/L Nitrogen 3.00 mg/L
Oak Creek including West Fork (In Verde Watershed) (Unique Waters standard)	Phosphorus 0.10 mg/L Nitrogen 1.00 mg/L	Phosphorus 0.25 mg/L Nitrogen 1.50 mg/L	Phosphorus 0.30 mg/L Nitrogen 2.50 mg/L
Black River, Tonto Creek and their tributaries (In Salt Watershed)	Phosphorus 0.10 mg/L Nitrogen 0.50 mg/L	Phosphorus 0.20 mg/L Nitrogen 1.00 mg/L	Phosphorus 0.80 mg/L Nitrogen 2.00 mg/L
Salt River and tributaries (except Pinal Creek) -- from confluence of Black and White to Roosevelt Lake	Phosphorus 0.12 mg/L Nitrogen 0.60 mg/L	Phosphorus 0.30 mg/L Nitrogen 1.20 mg/L	Phosphorus 1.00 mg/L Nitrogen 2.00 mg/L
Salt River -- below Stewart Mtn. Dam to confluence w/Verde River	Phosphorus 0.05 mg/L Nitrogen 0.60 mg/L	Phosphorus NNS Nitrogen NNS	Phosphorus 0.20 mg/L Nitrogen 3.00 mg/L
Roosevelt, Apache, Canyon, and Saguaro Lakes (composites at 2- and 5-meter depth)	Phosphorus 0.03 mg/L Nitrogen 0.30 mg/L	Phosphorus NNS Nitrogen NNS	Phosphorus 0.60 mg/L Nitrogen 1.00 mg/L (maximum of any set)
Little Colorado River and tributaries -- above River Reservoir. In Greer; So Fork LCR -- above South Fork Campground; and Water Canyon Creek --above USFS boundary	Phosphorus 0.08 mg/L Nitrogen 0.60 mg/L	Phosphorus 0.10 mg/L Nitrogen 0.75 mg/L	Phosphorus 0.75 mg/L Nitrogen 1.10 mg/L
Little Colorado River -- at Apache County Road No 124	Phosphorus NNS Nitrogen NNS	Phosphorus NNS Nitrogen NNS	Phosphorus 0.75 mg/L Nitrogen 1.80 mg/L
Little Colorado River -- from Amity Ditch diversion near AZ Hwy 273 to Lyman Lake (only when < 50 NTU)	Phosphorus 0.20 mg/L Nitrogen 0.70 mg/L	Phosphorus 0.30 mg/L Nitrogen 1.20 mg/L	Phosphorus 0.75 mg/L Nitrogen 1.50 mg/L
Colorado River -- at Mexico/US Northern International Border near Morales Dam	Phosphorus NNS Nitrogen NNS	Phosphorus 0.33 mg/L Nitrogen 2.50 mg/L	Phosphorus NNS Nitrogen NNS
San Pedro River -- from Curtis to Benson.	Phosphorus NNS Nitrogen NNS	Phosphorus NNS Nitrogen NNS	Phosphorus NNS Nitrate (as N) 10 mg/L



## Narrative Water Quality Standards

### Narrative Surface Water Quality Standards

R18-11-108 -- A surface water shall be free from pollutants in amounts or combinations that:

- & Settle to form bottom deposits that inhibit or prohibit the habitation, growth, or propagation of aquatic life or that impair recreational uses (bottom deposits standard);
- & Cause objectionable odor in the area in which the surface water is located;
- Cause off-taste or odor in drinking water;
- Cause off-flavor in aquatic organisms or waterfowl;
- & Are toxic to humans, animals, plants or other organisms (toxics standard);
- & Cause the growth of algae or aquatic plants that inhibit or prohibit the habitation, growth, or propagation of other aquatic life or that impair recreational uses (narrative nutrient standard);
- & Cause or contribute to a violation of an aquifer water quality standard prescribed in R18-11-405 or R18-11-406; or
- & Change the color of the surface water from natural background levels of color.

A surface water shall be free from oil, grease, and other pollutants that float as debris, foam, or scum; or that cause a film or iridescent appearance on the surface of the water; or that cause a deposit on a shoreline, bank, or aquatic vegetation. The discharge of lubricating oil or gasoline associated with the normal operation of a recreational water-craft shall not be considered a violation of this narrative standard.

### Narrative Aquifer Water Quality Standards

R18-11-405:

- A discharge shall not cause a pollutant to be present in an aquifer classified for a drinking water protected use in a concentration which endangers human health.
- A discharge shall not cause or contribute to a violation of a water quality standard established for a navigable water of the state.
- A discharge shall not cause a pollutant to be present in an aquifer which impairs existing or reasonably foreseeable uses of water in an aquifer.

## Arizona's Numeric Aquifer Water Quality Standards

ARIZONA'S GROUND WATER STANDARDS FOR INORGANIC CHEMICALS	
CONTAMINANT NAME (ABBREVIATION, TRADE OR GENERIC NAME)	AQUIFER WATER QUALITY STANDARDS ( µg/L unless stated)
Antimony (Sb)	6
Arsenic (As)	50
Asbestos	7,000,000 fibers/Liter (longer than 10 µm)
Barium (Ba)	2000
Beryllium (Be)	4
Cadmium (Cd)	5
Chromium (total) (Cr)	100
Cyanide (Cn)	200 (as free cyanide)
Fluoride (F)	4 mg/L
Lead (Pb)	50
Mercury (Hg)	2
Nickel (Ni)	100
Nitrate (NO <sub>3</sub> as N)	10.0 mg/L
Nitrite (NO <sub>2</sub> as N)	1.0 mg/L
Nitrate + Nitrite (as N)	10 mg/L
Selenium (Se)	50
Thallium (Tl)	2



ARIZONA'S GROUND WATER STANDARDS FOR ORGANIC CHEMICALS, PESTICIDES, PETROLEUM HYDROCARBONS, AND POLYCHLORINATED BIPHENYL (PCBs)	
CONTAMINANT NAME (ABBREVIATION, TRADE OR GENERIC NAME)	AQUIFER WATER QUALITY STANDARDS ( µg/L unless stated)
Alachlor (Lasso)	2
Atrazine (Atranex, Crisazina)	3
Benzene	5
Benzo(a)pyrene	0.2
Carbofuran (Furadan 4F)	40
Carbon tetrachloride (Freon-10)	5
Chlordane	2
2,4-D (Formula 40, Weedar 64) 2,4-Dichlorophenoxyacetic Acid	70
Dalapon or 2,2-Dichloropropionic acid	200
Dibromochloromethane (DBCM or THM)	0.2
Dibromochloropropane (DBCP)	0.2
Dichlorobenzene (DCB)	o-DCB = 600 p-DCB = 75
Dichloroethane (DCA)	1,2-DCA = 5
Dichloroethylene or Dichloroethane (DCE)	1,1-DCE = 7 cis-1,2-DCE = 70 trans-1,2-DCE = 100
Dichloromethane	5
Dichloropropane	1,2-DCP = 5
Di(2-ethylhexyl)adipate (DOA)	400
Di(2-ethylhexyl)phthalate (DOP)	6
Dinoseb 2,4-Dinitro-6-sec-butyl-phenol (DNBP)	7
Dioxin 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	0.00003
Diquat or Dihydrodipyrido-pyrazidinium salt	20

ARIZONA'S GROUND WATER STANDARDS FOR ORGANIC CHEMICALS, PESTICIDES, PETROLEUM HYDROCARBONS, AND POLYCHLORINATED BIPHENYL (PCBs)	
CONTAMINANT NAME (ABBREVIATION, TRADE OR GENERIC NAME)	AQUIFER WATER QUALITY STANDARDS ( µg/L unless stated)
Endothall or Oxalobicyclo-heptane-dicarboxylic acid disodium salt	100
Endrin or Hexachloroepoxooctahydro-endo-dimethanonaphthalene	2
Ethylene dibromide (EDB)	0.05
Ethylbenzene (ETB)	700
Glyphosate or N-(phosphonomethyl)glycine	700
Heptachlor	0.4
Heptachlor epoxide	0.2
Hexachlorobenzene or Perchlorobenzene	1
Hexachlorocyclopentadiene or Perchlorocyclopentadiene	50
Lindane or gamma-Benzene hexachloride	0.2
Methoxychlor (Methoxy DDT, DMDT)	40
Monochlorobenzene, or Chlorobenzene, or Phenyl chloride	100
Oxamyl	200
Perchloroethylene (PCE), Tetrachloroethylene or Tetrachloroethene	5
Pentachlorophenol	1
Picloram	500
Polychlorinated biphenyl (PCB)	0.5
Silvex 2-(2,4,5-Trichlorophenoxy)propionic acid	50
Simazine 2-Chloro-4,6-bis(ethylamino)-2-triazine	4
Styrene	100
1,2,4-Trichlorobenzene	70
Trichloroethane (TCA)	1,1,1-TCA = 200 1,1,2-TCA = 5
Trichloroethylene or Trichloroethene (TCE)	5